Confidential

MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COMMITTEE,

1871.

LONDON:
PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1872.

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MINUTES OF THE PROCEEDINGS

OF THE

METEOROLOGICAL COMMITTEE.

116, *Victoria Street, January* 2, 1871.

PRESENT:

Mr. Galton in the Chair.
Mr. De La Rue. | Mr. Gassiot.
Sir E. Sabine.

The Director was in attendance.

The Minutes of last meeting (December 19) were read and confirmed.

Reported—That at the request of Sir W. Mitchell arrangements had been made to furnish daily from the office a chart showing the wind (direction and force) at 8 a.m. at the telegraphic reporting stations, for publication in the "Shipping and Mercantile Gazette."—Approved.

Submitted—A letter from Gen. Myers, Chief Signal Officer U.S. Army, announcing the establishment of a system of weather telegraphy in the United States.

Mr. Galton exhibited the model of his proposed instrument for drawing curves of vapour tension (Minutes, Dec. 19).

Resolved—That a sum not exceeding 80*l.* be placed at Mr. Galton's disposal for the construction of his vapour tension instrument.

Submitted—The following paper, which was ordered to be printed:—

I propose for the consideration of the Committee, that they should cause certain numerical tables to be constructed at a cost not exceeding 7*l.*, and that these should be employed when there is leisure to do so, in plotting out a series of tracings, to be published so far and in such a manner as after experience may advise.

My object is to obtain for some given geographical area of moderate size, a continuous graphical record of the two following conditions, or rather of simple functions of them, which I need not stop to describe. These conditions are—(1) the tangent of inclination of the barometric surface to the plane of the horizon, and (2) the direction towards which that plane is inclined, and I desire to see these traces graphically collated with the force and direction of the wind actually experienced in that area. It is reasonable to expect that the one pair of tracings would be more or less parallel to the other, because there exists (as I have myself elsewhere shown) a rough accordance, when looked at from a certain point of view, between the variations of the barometric height and those of the force of the wind, although the former is a very imperfect expression of the disturbance of barometric equilibrium at neighbouring stations. It is, indeed, no more than a record of the successive inclinations of the line which bounds a vertical section of the barometric surface, made along the line of movement of the atmospheric waves. It is impossible that the barometric curve, taken by itself, should be a just measure of the disturbance of barometric equilibrium between adjacent stations, except in the one case where the apex of the wave has happened to pass over both the stations, and the shape of the wave has remained unchanged in the interval, an event which must be of extremely rare occurrence on account of the vast size and rapid changes of form of barometric waves.

Again, the researches of Buys Ballot give great reason to expect that the curves representing the barometric inclination and its direction, should be respectively parallel to those of wind velocity and direction, but his valuable researches do not supersede the necessity of what I propose, because they were based on observations taken periodically at intervals of many hours, and therefore cannot compare in instructiveness with what we may obtain from our continuous records.

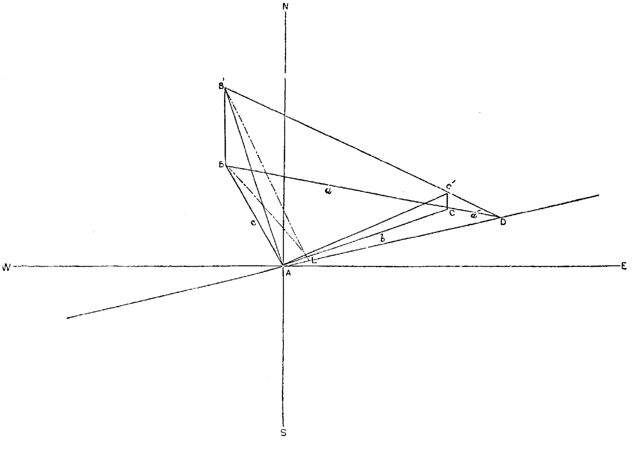
I propose to take three of our stations, forming a triangle not far removed from an equilateral one, such as Valentia, Falmouth, and Stonyhurst, and to use the tables by entering them at the side with the barometric difference between Valentia and Falmouth, and entering them at the top with the barometric difference between Valentia and Stonyhurst and to read off (1) the tangent of what in the language of geologists would be called the barometric *dip*, and (2) the barometric *strike*. I would use the strike rather than the direction of the dip, because of the greater tendency of the wind to blow tangentially to the line of steepest gradient than along it, and, therefore, the curve representing the strike would be somewhat more convenient for purposes of comparison with wind direction than showing the direction of the dip. The readings of barometric dip and strike would apply most nearly to stations in the centre of the triangular area at whose corners Valentia, Falmouth, and Stonyhurst are situated, but they would apply with sufficient correctness to the three stations themselves, and it is with the winds direction and force at one or other of these, that I propose they should be collated.

It appears to me that the tracings of barometric dip and strike would put us in complete possession of the chief data upon which the most elementary form of weather calculation must depend, because they give us the extent and direction in which the equilibrium of the air is at each moment disturbed, as a supplement to the knowledge we already possess, of the velocity and direction of the existing winds, and it follows that considerable insight into the character of the wind about to be experienced might be derived from the simple principle of composition of forces. There remains, of course, a difficulty arising from our ignorance of the upper aerial currents, and from the fact that different currents are so interwoven that an upper current at one station may become the lower one at another. Nevertheless we may deal successfully with a large part of the problem, and may reasonably hope to make a sensible advance towards what may be considered as the goal of our endeavours, namely, the establishment of means whereby wind traces, calculated on the basis of antecedent observations, shall, so far as practical purposes are concerned, coincide with the curves actually made by the anemometer.

The tables I propose would be equally applicable to thermic and psychrometric planes, should such be hereafter wanted, and I may add that if it should be thought worth while to construct a "relief" from these tables to fit into my instrument for pricking off the curves of vapour tension, the barometric dip and strike could be pricked off with rapidity.

(Signed) F. Galton.

I append the simple formula by which the tables would be calculated:—



Let A, B, C, be the three stations; BB', CC' the Valentia—Falmouth, and the Valentia—Stonyhurst barometric differences (attending to their signs.) Let BC and BC', produced if necessary, meet at D. Then AD is the line of strike of the barometric plane, and we must determine the $\angle$· BAD, whence, as the bearing of AB is known, the bearing of AD is immediately deduced.

$$\text{Now BD} = \frac{\text{BC} \times \text{BB}'}{\text{BB}' - \text{CC}'}$$

And since BA and the included angle at B are given, we calculate the angle at A by the usual formulæ :—

$$\tan. \frac{A-D}{2} = \frac{BD + BA}{BD - BA} \tan. \frac{180^\circ - B}{2} \text{ and } A + D = 180^\circ - B.$$

To determine the tangent of the dip, let fall a perpendicular B′L from B′ on AD, produced if necessary, and join BL then the required tangent is

$$\frac{BB'}{BL} = \frac{BB'}{AB \sin. A.}$$

Resolved—That Mr. De La Rue and Mr. Galton be a sub-committee with powers to arrange the form of publication of the instrumental tracings in the Weather Report for 1870.

The Committee then adjourned.

116, *Victoria Street, January* 16, 1871.

PRESENT :

Sir E. Sabine in the Chair.

Mr. De La Rue.
Mr. Gassiot.
Admiral Richards.
Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting (January 2) were read and confirmed.

Submitted—A report from Kew respecting the corrections of the twelve hydrometers ordered to be sent for reverification (Minutes 1870, p. 87). As these corrections differed widely from those previously furnished for the same instruments, Mr. De La Rue was requested to inquire into the alleged discrepancies in the testing of the instruments.

Submitted—An estimate for 6*l.* for the erection of a railing for the protection of the rain gauge at Armagh.—Approved.

Resolved—That a spare drum be supplied for each of the self-recording rain gauges.

The attention of the Committee having been drawn to the fact that several defective curves had been inked in at Kew (letter No. 82, 1871), it was resolved that no rectification of curves should be made, and that a memorandum to this effect should be transmitted to the Superintendent of Kew Observatory, and to the other observatories.

Read—A letter from Captain Toynbee, submitting excellent logs kept by

Captain T. M. Almond, ship " Decapolis."
,, F. B. Bouchette, SS. " European."
,, Samuel Brooks, SS. " City of Brooklyn."
,, C. Davidson, ship " Perseverance."
,, Theodore Leportier, ship " Kate."
,, J. A. Williams, SS. " Wisconsin."

And recommending that copies of the Pilot charts be presented to each of these gentlemen, except Captain Brooks, who has already received them (Minutes 1869, pp. 21, 103).

Resolved—That Captain Toynbee's recommendation be complied with, and that a letter be written to Captain Brooks, thanking him for his zeal in the work of observation.

Accounts Paid, and Liabilities, to 31st December 1870.

——	Paid.			Estimated Liabilities.		
	£	s.	d.	£	s.	d.
Office :—						
Salaries - - -	898	5	0		—	
Rent, fuel, &c. - -	348	13	7		—	
Contingencies - - -	208	19	0	25	0	0
Land Meteorology :—						
Expenses at observatories -	1,935	11	1	39	0	0
New instruments for ditto -	407	0	4	524	0	0
Computations - - -	554	9	6		—	
Telegraphy - - -	211	19	8	1,456	0	0
Inspections, &c. - -	150	18	11		—	
Computations - -	283	12	9		—	
Ocean Meteorology :—						
Marine superintendent -	300	0	0		—	
Instruments, Admiralty -	69	14	11	28	0	0
Ditto Mercantile Marine -	431	1	8	198	0	0
Computations and care of instruments - -	647	18	0		—	
Totals - -	6,448	4	5	2,270	0	0

Grand Total - - £8,718 4*s.* 5*d.*

SUBMITTED—The following STATEMENT respecting the RECORDS for December 1870 received from the self-recording Observatories, and which have been examined at Kew Observatory (See Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Fair.		Good.		Good.		Good.		Fair.		Good.	
Records deficient	None.		9 hours velocity. rendered doubtful through extreme cold.		None.		24 hours V. and D.*		None.		None.		None.	
Orientation verified	16th found correct.		—		15th Correct.		28th correct.		31st correct.		16th correct.		2nd correct.	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity	Direction.	Velocity.
Greatest difference	0·0	1·0	1·0	1·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·0	0·4	0·2	0·4	0·2	0·5	0·2	0·8	0·1	0·3	0·1	0·5	0·2	0·7
Residual difference (—Kew)	0·0	+0·1	−0·1	+0·1	0·0	0·0	0·0	−0·2	−0·1	0·0	+0·1	−0·1	0·0	+0·1
No. of errors discovered	None.		None.		0	2	1	1	0	1	0	0	0	9
BAROGRAPH :—														
Action	Good.		Good.		Fair.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Indifferent.		Good.		Good.		Good.	
Records deficient	12 hourly values.		None.		None.		14 hourly values.		None.		None.		2 hourly values. doubtful.	
Result of 40 *Remeasurements* :—														
Greatest difference	·0060		·0060		·0060		·0060		·0060		·0060		·0060	
Mean difference irrespective of sign	·0013		·0025		·0022		·0019		·0019		·0019		·0020	
Residual difference (—Kew)	—·0002		+·0010		—·0003		—·0005		—·0006		—·0013		+·0011	
Mean monthly difference between simultaneous barograph and barometer														
No. of errors discovered in entry of standard	0		0		0		0		0		1		1	
,, in calculating residual correction	0		0		1		2		0		0		1	
,, in applying residual correction	5		0		0		0		0		0		23	
,, in tabulation	0		0		0		0		0		0		0	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	† 50 wet, 1 dry.		† 30 wet, 1 dry.		† 13 wet.		† 82 wet, 5 dry.		† 23 wet, 1 dry.		† 22 wet, 4 dry.		† 27 wet, 1 dry.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·2	0·2	0·2	0·2	0·2	0·2	0·3	0·3	0·1	0·2	0·2	0·3	0·2	0·2
Mean difference irrespective of sign	0·08	0·09	0·07	0·08	0·10	0·10	·08	0·08	0·05	·06	0·07	0·08	0·06	0·07
Residual difference (—Kew)	0·00	+0·04	—0·03	—0·01	0·00	—0·03	+0·08	+0·08	—0·01	—0·04	—·01	+·04	—0·06	—0·05
Mean monthly difference between simultaneous thermograph and thermometer	0·15	0·15	0·11	0·14	0·08	0·10	0·08	0·11	0·10	0·09	0·10	0·11	0·14	0·19
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	0	0	5	0
,, discovered by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
,, in maximum and minimum	0	0	0	0	0	0	0	0	0	0	0	0	3	4
,, in tabulation	0	0	1	0	‡	0	§	0	0	0	0	0	2	0

* A sheet of unprepared paper having been put on the cylinder.

‡ Three days dry bulb curve have been retabulated at Kew.

† The deficiency in wet bulb readings is mainly to be attributed to the action of frost.

§ One day wet bulb curve has been retabulated at Kew.

The Committee then adjourned.

116, *Victoria Street, January* 30, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Admiral Richards.
Mr. Galton.	Colonel Smythe.
Mr. Gassiot.	Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting (January 16) were read and confirmed.

Submitted—A scheme proposed by Mr. Galton for the publication of the records for 1870, and approved by the sub-committee appointed January 2.—Adopted.

Mr. Galton brought under the notice of the Committee a method of representing on two page-plates of the Quarterly Weather Report, a summary of a year's records of the barogram, thermogram (dry), and wind direction at one station. The Committee, while admitting the great value which the presentation of the phenomena of a year at one view would have, thought it advisable to postpone the publication of such a summary until after the arrangements for printing the curves from copper plates on the new scheme, were completed.

Reported—That at Dr. Carpenter's request, information as to the surface temperature of the Atlantic near Gibraltar had been supplied to him.—Approved.

Submitted—An estimate for a new bookcase for the office, to cost 12*l.* 10*s.*—Accepted.

Read—A letter from Captain Toynbee, submitting excellent logs kept by—

Captain F. Wherland, ship "Galatea."
„ A. A. Jones, ship "Victoria Nyanza."
„ J. O. Hopkins, H.M.S. "Liverpool."
Log kept by Staff Commander W. H. Sharp.

Captain Wherland and Captain Jones have already received the charts (Minutes, 1869, p. 90, 1870, p. 1.) Mr. Scott was therefore instructed to express to them, as well as to Captain Hopkins and Staff Commander Sharp, the marked thanks of the Committee for their very valuable observations.

The following cheques were drawn:—

				£	s.	d.
For Office:						
R. H. Scott - Salaries and wages				66	13	4
J. S. Harding, jun. „ „				15	0	0
J. S. Harding, sen. „ „				*7	14	0
T. D. Bell - „ „				*3	6	0
Davey, Thompson, and Co., coals				2	6	0
Henry Stone, paper boxes				4	10	0
Williams and Norgate, books, &c.				6	1	6
For Observatories:						
R. and J. Beck, zinc plates	4	18	0			
„ altering pantagraphs	5	6	0			
„ models	8	10	0			
„ mounted mirror	1	1	0			
				19	15	0
J. J. Hicks, S.R. rain gauges				249	0	11
Hopkin and Williams, chemicals				25	13	7
Thos. Kerr, Valencia, salary for January				20	16	8
W. Longman, copper plates				4	3	9
D. Pound, engraving plates, &c.				13	3	0
S. Jeffery - Salaries and computations				*12	0	0
E. Magrath - „ „				*5	12	0
J. P. Cutts - „ „				*3	0	0
R. H. Curtis - „ „				8	6	8
F. Steventon - „ „				7	10	0
C. Stodart - „ „				*8	0	0
Carried forward				482	12	5

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* Four weeks to 28th.

				£	s.	d.
Brought forward				482	12	5
For Telegraphy:						
S. M. Clare, Submarine Co., October	20	3	3			
„ „ November	18	6	9			
				38	10	0
F. Gaster - Salaries and computations				11	13	4
F. Brodie - „ „				*3	12	0
G. G. Francis - „ „				*3	8	0
For Ocean Meteorology:						
H. Toynbee, marine superintendent				33	6	8
Negretti and Zambra "A" instruments	3	15	0			
„ M.O. „	58	17	10			
				62	12	10
P. Adie, M.O. instruments				18	14	6
E. Higgs, packing cases				11	7	6
J. J. Hicks, hydrometers				28	10	0
R. Riviere, binding pilot charts				15	6	0
Williams and Norgate, pilot charts				10	0	0
W. Salmon - Salaries and computations				19	3	4
R. Strachan - „ „				†17	10	0
C. Harding - „ „				10	0	0
J. A. Curtis - „ „				*5	12	0
W. G. James - „ „				*5	12	0
J. W. McVeagh „ „				*2	8	0
For Office Expenses:						
J. S. Harding, jun., on account				78	0	0
Total				£857	18	7

* Four weeks to 28th.
† Including allowance for care of instruments.

The Committee then adjourned.

116, *Victoria Street, February* 6, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Galton.
Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting (January 30) were read and confirmed.

Read—A letter from Captain Toynbee, submitting an excellent register kept by Captain S. T. S. Lecky, R.N.R., of the S.S. "Halley."

Captain Lecky having already been three times mentioned in the Minutes (1868, p. 48; 1870, pp. 6, 60), and having received the Pilot Charts, Mr. Scott was instructed to express to him the marked thanks of the Committee for his services.

Mr. Scott was instructed to make arrangements for the exhibition of Mr. Galton's Pantagraph, &c. at the President's Soirée at the Royal Society.

The Committee then adjourned.

116, *Victoria Street, February* 20, 1871.

PRESENT :

Sir E. Sabine in the Chair.

Mr. De La Rue.	Colonel Smythe.
Mr. Galton.	Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting (Feb. 6) were read and confirmed.

Submitted—Part III. of the Quarterly Weather Report for 1869.

Reported—That Professor Main, of the Royal Naval College, Portsmouth, had applied for any duplicates of meteorological works which might be spared from the office for the library of the College, and that a list of such duplicates had been at once supplied for him to select such works as he required.—Approved.

Submitted—An application from M. Wojeikoff, of St. Petersburg, for meteorological information from the Atlantic and from North America, bearing on the weather of certain days in the years 1860 and 1868.

Resolved—That M. Wojeikoff should be informed of the cost of copying the information.

Reported—That an application had been received for the issue of telegraphic intelligence to Kirkwall, and that accordingly it would be very advisable to establish a telegraphic reporting station in the Orkney Islands.

Mr. Scott was instructed to make inquiries as to the feasibility of such an arrangement being made.

Reported—That the telegraph wires had been brought into the office (Minutes, 1870, p. 57).

Submitted the following **Statement** respecting the **Records** for January 1871, received from the self-recording Observatories, and which have been examined at **Kew Observatory** (see Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action - - - - - -	Good.		Fair.		Good.		Fair.		Good.		Good.		Good.	
Records deficient - - - -	None.		14 hours velocity lost.		None.		None.		None.		* 33 hours velocity and direction.		None.	
Orientation verified - - - -	—		—		Jan. 17th correct.		—		—		Jan. 18th correct.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference - - - -	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign - -	0·2	0·5	0·3	0·5	0·3	0·6	0·1	0·6	0·1	0·3	0·3	0·5	0·2	0·6
Residual difference (— Kew) - - -	0·0	+0·2	−0·3	+0·4	+0·1	+0·3	0·0	+0·3	0·0	0·0	+0·1	0·0	+0·1	+0·2
No. of errors discovered - - -	0	0	0	0	0	0	0	0	0	0	0	0	0	13
BAROGRAPH :—														
Action - - - - - -	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography - - - - -	Good.		Good.		Good.		Fair.		Good.		Good.		Good.	
Records deficient - - - -	None.		None.		None.		2 hours.		1 hour.		3 hours.		2 hours.	
Result of 40 *Remeasurements* :—														
Greatest difference - - - -	·005		·006		·006		·005		·006		·005		·005	
Mean difference irrespective of sign - -	·0018		·0024		·0017		·0018		·0022		·0020		·0020	
Residual difference (— Kew) - - -	—·0007		+·0008		—·0002		+·0001		+·0008		+·0004		—·0012	
Mean monthly difference between simultaneous barograph and barometer - - -	·0020		·0030		·0020		·0023		·0020		·0010		·0030	
No. of errors discovered in entry of standard -	0		2		2		1		1		0		0	
,, in calculating residual correction - -	0		0		1		1		0		0		1	
,, in applying residual correction - -	2		0		0		2		6		0		57	
,, in tabulation - - - -	0		1		0		0		0		0		1	
THERMOGRAPH :—														
Action - - - - - -	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography - - - - -	Good.		Good.		Good.		Fair.		Fair.		Fair.		Good.	
Records deficient - - - -	† 89 hours wet bulb.		† 39 hours wet bulb.		† 28 hours wet bulb ; 1 hour dry.		† 72 hours wet.		† 88 hours wet bulb ; 2 hours dry.		† 35 hours wet ; 8 hours dry.		None.	
Result of 40 *Remeasurements* :	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference - - - -	0·2	0·2	0·3	0·2	0·2	0·2	0·2	0·2	0·1	0·2	0·2	0·2	0·2	0·2
Mean difference irrespective of sign - -	0·10	0·07	0·10	0·08	0·07	0·07	0·09	0·08	0·05	0·05	0·09	0·09	0·09	0·08
Residual difference (— Kew) - - -	+0·03	+0·03	+0·01	+0·04	+0·01	−0·03	−0·06	0·00	0·00	−0·01	−0·01	−0·05	+0·04	0·00
Mean monthly difference between simultaneous thermograph and thermometer - -	0·15	0·13	0·11	0·11	0·07	0·08	0·09	0·10	0·11	0·12	0·10	0·15	0·13	0·14
No. of errors discovered in entry of standard -	0	0	0	0	0	0	0	0	0	0	0	0	0	0
,, discovered by subsidiary measurements -	0	0	0	0	0	0	0	0	0	0	0	0	0	0
,, in maximum and minimum - - -	0	0	0	0	0	0	0	0	0	0	0	0	4	4
,, in tabulation - - - -	0	2	0	0	‡	0	§	1	0	0	0	0	0	0

* Instrument dismounted for cleaning. † Due to the action of frost. ‡ One day dry bulb curve re-tabulated at Kew. § Two days dry bulb, and three days wet bulb, re-tabulated at Kew.

The Committee then adjourned.

116, *Victoria Street, March* 6, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Admiral Richards.
Mr. Galton.	Colonel Smythe.

Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting (February 20th) were read and confirmed.

Mr. Scott reported that there were in the office charts of the currents of the North Atlantic, from the equator to 40° N. in $2\frac{1}{2}$ degree squares for each month and for the year, and that the expense of lithographing these charts would be 43*l.* 17*s.*

Resolved—That these charts be published, together with the results of the observations taken at Vancouver Island.

Mr. Galton submitted a model of his instrument for correcting the bagging of the curves, and the sum of 80*l.* was placed at his disposal for its construction.

Mr. De La Rue reported that he had inspected the new set of instruments at Mr. Munro's, and that his proposal for the alteration of the recording portion of the anemometer had been very neatly carried out by Mr. Beckley. The vertical shaft which carries the balls is connected with a horizontal shaft which moves the style along the drum, by means of a horizontal face ratchet-wheel; every hour the palls of this ratchet-wheel are lifted by a notched wheel on the clock, and the style is then pulled back by a weight in about 4 seconds to its zero position. The drum of the present anemometer is not long enough to record a velocity of more than 50 miles in the hour, and Mr. De La Rue has ordered a new drum to be made to the instrument capable of recording a velocity of 80 miles per hour. With respect to the bagging of the baro-photograms Mr. De La Rue considers that it is in part due to change of temperature, caused by the heat of the lamp acting on the stand of the instrument, and in part by the paper not being truly placed on the drum. The temperature effects can be got rid of.

Submitted—A letter from Captain Toynbee submitting excellent logs kept by—

Capt. David Smith, ship "Wiltshire;"
Capt. John F. Angel, ship "Twilight;"

and recommending them for presentation copies of the Pilot Charts.

Also by Capt. James Hayes, S.S. "Ptolemy," (Minutes 1869, p. 53; 1870, pp. 38, 76);
Capt. Henry Henderson, barque "Hope," (Minutes 1869, p. 53; 1870, p. 36);
Capt. D. Hunter, S.S. "Alpha and Delta" (Minutes 1869, p. 113),

who have already received the charts.

Resolved—That the charts be presented to Captain Angel and Captain Smith, and that Mr. Scott be instructed to write to the other three gentlemen expressing to them the marked thanks of the Committee for their continued co-operation in the work.

Reported—That applications for telegraphic weather intelligence from the following places having been approved by the Board of Trade, they have been added to the list of stations warned:—

Boness.
Hawarden.
Limerick.
Poole.
Silloth.
Swansea.
Castletown.
Kirkwall.
New Ross.
St. Monance.
Southwold.

Also that an application from Greystones had been refused by the Board of Trade.

Reported—That on the 20th inst., on the signature of Mr. De La Rue, the sum of 2000*l.* had been transferred from the deposit account of the Committee in the London and Westminster Bank to their current account in the Bank of England.—Approved.

Reported—That the following cheques were drawn, 27th February, on the signature of Mr. De La Rue:—

					£	*s.*	*d.*
For Office:							
R. H. Scott	Salaries and wages				66	13	4
J. S. Harding, jun.					15	0	0
J. S. Harding, sen.					*7	14	0
T. D. Bell					*3	6	0
The Gaslight Company, December quarter					3	17	3
Sadgrove and Co., furniture					13	8	6
For Observatories:							
T. Kerr, Valencia, salary for February					20	16	8
J. J. Hicks, rain gauge cylinders					12	18	6
S. Jeffery	Salaries and computations				*12	0	0
E. Magrath					*5	12	0
J. P. Cutts					*3	0	0
R. H. Curtis					8	6	8
F. Steventon					7	10	0
C. Stodart					*8	0	0
For Telegraphy:							
S. M. Clare, Submarine Company, Dec. 1870		12	5	5			
,, ,, Jan. 1871		11	12	11			
,, Warnings at Jersey, 1870		1	14	10			
					25	13	2
F. Gaster	Salaries and computations				11	13	4
F. Brodie					*3	12	0
G. G. Francis					*3	8	0
For Ocean Meteorology:							
H. Toynbee, Marine Superintendent					33	6	8
W. Salmon	Salaries and computations				19	3	4
R. Strachan					†17	10	0
C. Harding					10	0	0
J. Curtis					*5	12	0
W. G. James					*5	12	0
J. W. McVeagh					*2	8	0
For Office Expenses:							
J. S. Harding, jun., on account					90	0	0
Total					£416	1	5

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* Four weeks, to 25th.

† Including allowance for care of instruments.

The Committee then adjourned.

116, *Victoria Street, March* 20, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Admiral Richards.
Mr. Galton.	Colonel Smythe.
Mr. Gassiot.	Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, March 6, were read and confirmed.

Read the following letter:—

India Office, S.W., 17th March 1871.

SIR,

1. I AM desired by the Secretary of State for India, with reference to the Meteorological Reports from India that have been forwarded to your address, to request that the Meteorological Committee will take the subjects of those reports into their consideration, and furnish His Grace with any advice or observations that their experience may suggest.

2. The organization of Meteorological Departments was commenced in India in 1867. There are now official reporters to the Governments of Bengal, the North-west Provinces, and the Punjaub. In each of these governments there is a series of stations where observations are regularly taken, the results of which are periodically forwarded to the reporter, who submits an annual report. The nature and scope of the observations are shown in the reports. In Madras 18 stations are to be established, under the supervision of Mr. Pogson, the astronomer. At Bombay there is a well-organized meteorological observatory under Mr. Chambers, whose work is regularly forwarded to the Astronomer Royal; but no series of stations has yet been established throughout the Bombay districts, as is the case in the other Indian Governments.

Mr. Blanford, the Bengal reporter, has paid much attention to the laws of storms and to the observation of cyclones, and his objects embrace that department of meteorological science. The careful observation of all phenomena connected with the monsoons is another branch of Indian meteorology which is of great practical importance; and the results of the observations, if taken on a correct system, should be useful to the agriculturist and to the sanitary officer, as well as to other departments of science.

3. The Duke of Argyll believes that the Committee are in a position to give valuable assistance to the observers in India, and in furtherance of the objects of the Indian Government in organizing meteorological stations. It is desirable that the elements necessary for arriving at the required results should be well known, as well as that useless observations should not be accumulated. It is also very important that a system should be introduced uniform with those already adopted by the best observers in other parts of the world, in order to facilitate comparison, and thus make the Indian work useful to science generally. Other points will doubtless suggest themselves to the Committee on perusing the reports, both as regards methods of observing, the organization of the Department, and the utilization of results.

The Duke of Argyll will be obliged for any observations on the whole subject with which the Committee may favour him.

I am, &c.,
(Signed) J. COSMO MELVILL.

R. H. Scott, Esq.,
Meteorological Office.

List of reports sent specified in the letter.

Resolved—That Col. Walker be requested to aid the Committee in preparing recommendations for meteorological observations in India.

Read—A letter of which the following is a translation:—

Norddeutsche Seewarte, Hamburg,
18th March 1871.

DEAR MR. SCOTT,

I FOLLOW up my letter of yesterday by another to-day, because I have this morning received a reply to a matter long outstanding—I cannot obtain a vacuometer from German workmen; therefore I take the liberty of addressing to you briefly the following questions:—

1. Would your (or Dr. Stewart's) mechanician construct such an instrument for the N.D. Seewarte, and at what price?

2. Would you kindly not refuse your assistance, and have the apparatus tried when done? In about what time would it be ready?

3. My normal instrument is a syphon barometer. It must, therefore, be made to communicate with the rarefied or compressed air in the vacuometer by means of an india-rubber tube. I think there should be room in the vacuometer for two instruments to be tested; then, after having found a thoroughly reliable and tested marine barometer, this could be more conveniently used as a vice-normal instrument.

4. I do not want a large cathetometer, but only such a one as is requisite for this special purpose.

* * * * * The horizontal movements must, of course, be very accurate, and be hung exactly vertically, in order to obviate accessibility to the verniers of the barometers. But these explanations are unnecessary.

Always yours,
(Signed) W. H. v. FREEDEN.

Mr. Scott reported that there was in the possession of the Committee a spare instrument of the nature required by Herr von Freeden; it was at the nautical school at Liverpool. He was instructed to offer this instrument to the Norddeutsche Seewarte at a fair price, say two-thirds of its cost price.

Mr. Scott reported that copies of the daily weather report had been supplied to Wildman Whitehouse, Esq.

Submitted—An application from Commander Moriarty for a fishery barometer for Malahide.—Granted.

Read—A letter from Capt. Toynbee, submitting excellent logs kept by Capt. J. Bruce, ship "City of Adelaide;" Capt. A. Simpson, schooner "Traveller;" Capt. W. Symington, ships "Northfleet" and "Flying Venus;" and recommending them for presentation copies of the pilot charts. Also by Capt. John A. Martyn ss. "Samaria" (Minutes, 1869, pp. 21, 61; 1870, pp. 21, 76), Capt. F.P. Carruthers, ship "Minero" (Minutes, 1870, p. 15), who have already received the charts.

Resolved—That Capt. Toynbee's suggestion be complied with and that pilot charts be presented to Capts. Bruce, Simpson, and Symington; Mr. Scott to thank Capts. Martyn and Carruthers for their registers.

SUBMITTED the following STATEMENT respecting the RECORDS for FEBRUARY 1871, received from the SELF-RECORDING OBSERVATORIES, and which have been examined at KEW OBSERVATORY (*see* Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		‡Good.		Good.	
Records deficient	None.		*10 hours velocity lost on the 1st.		None.		†7 hours velocity and direction lost on 23rd.		None.		None.		None.	
Orientation verified	—		—		Feb. 13th.		—		Feb. 22nd.		Feb. 17th.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·2	0·5	0·3	0·4	0·1	0·6	0·2	0·8	0·1	0·2	0·2	0·4	0·3	0·5
Residual difference (— Kew)	+0·2	−0·1	−0·2	+0·1	0·0	−0·1	−0·1	+0·2	0·0	0·0	0·0	−0·1	0·0	0·0
No. of errors discovered	None.	1	None.	None.	0	1	0	3	0	0	1	0	1	20
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Fair.		Good.		Good.		Good.	
Records deficient	None.		None.		None.		None.		None.		None.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference	·0050		·0060		·0050		·0050		·0050		·0050		·0050	
Mean difference irrespective of sign	·0018		·0025		·0020		·0022		·0015		·0022		·0018	
Residual difference (— Kew)	—·0008		+·0015		+·0005		+·0011		—·0001		—·0004		—·0008	
Mean monthly difference between simultaneous barograph and barometer	·0015		·0023		·0020		·0021		·0020		·0017		·0024	
No. of errors discovered in entry of standard	0		0		0		1		0		0		0	
„ in calculating residual correction	0		0		1		1		0		0		0	
„ in applying residual correction	0		0		0		0		2		0		2	
„ in tabulation	0		0		0		1		0		0		3	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	§49 hours wet.		None.		None.		‖20 hours wet.		§4 hours wet.		§3 hours wet.		None.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·1	0·2	0·2	0·2	0·2	0·2
Mean difference irrespective of sign	·08	·08	·10	·09	·08	·07	·10	·09	·05	·05	·09	·07	·08	·09
Residual difference (— Kew)	+·04	+·05	—·08	—·06	—·03	+·02	+·05	+·03	—·03	—·02	+·05	+·04	—·04	—·04
Mean monthly difference between simultaneous thermograph and thermometer	0·15	0·13	0·12	0·14	0·08	0·08	0·09	0·09	0·13	0·12	0·09	0·11	0·16	0·16
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ discovered by subsidiary measurements	0	0	0	0	0	0	2	0	0	0	0	0	0	0
„ maximum and minimum	0	0	0	0	0	0	0	1	0	0	0	0	2	4
„ in tabulation	0	0	0	1	0	0	0	0	0	0	0	0	0	1

* The pencils not being properly adjusted.

§ Through frost.

† Clock run down.

‖ 1 hour through frost; 8 not in proper action, and 11 doubtful.

‡ Excepting a failure of velocity trace for about 20 minutes on the 12th.

The Committee then adjourned.

116, *Victoria Street, March* 27, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Colonel Smythe.
Mr. Galton.	Mr. Spottiswoode.

Colonel Walker was present by invitation of the Committee.

The Director was in attendance.

A draft reply to the India Office was submitted, and after discussion, was ordered to be printed for reconsideration at next meeting.

Read—A letter from Herr v. Freeden accepting the apparatus for testing barometers at the price of 42*l.*, being three-fourths of its original cost. Mr. Scott was instructed to have the instrument removed from Liverpool and examined in London, prior to despatching it.

Mr. Scott reported that he would be ready to commence direct telegraphy from the office on the 1st of April, and that he proposed to have four at least of the clerks taught the use of the instrument. He further proposed that two of the clerks should stay daily for an hour extra time, to attend to the telegrams, the payment for this work to be in proportion to their regular salaries—Approved.

Reported—That the Daily Weather Report had been issued to W. Dymond, Esq., Royal Cornwall Polytechnic Institution, Falmouth.

Reported—That Captain Toynbee had been requested by the Council of the United Service Institution to give a lecture on the "Winds of the Atlantic"—Sanctioned.

Submitted—A copy of the "Barometer Manual." (Minutes, June 15th, 1868.)

Mr. Scott was instructed to apply to the Treasury on the 1st of April for an imprest of 2,000*l.* for the current expenses of the Office.

The following cheques were drawn:—

					£	*s.*	*d.*
For Office:							
R. H. Scott	Salaries and wages				66	13	4
J. S. Harding, junr.					15	0	0
J. S. Harding, senr.					*9	12	6
T. D. Bell					*4	2	6
Davey, Thompson, & Co., coals					2	6	0
Davy & Sons, special printing					3	1	10
C. Dunning, book presses, &c.		14	12	6			
,, repairs, &c.		0	14	0			
					15	6	6
C. W. Jacques, rent, No. 116		93	2	6			
,, ,, No. 113		22	15	3			
,, alterations in office		4	12	2			
					120	9	11
J. Rowsell, books					9	11	0
For observatories, quarterly allowances, &c.:							
D. Thompson, (Aberdeen)		62	10	0			
Less chemicals supplied		0	11	2			
					61	18	10
Carried forward					308	2	5

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* Five weeks to the 1st April.

	£	s.	d.	£	s.	d.
Brought forward				308	2	5
T R. Robinson (Armagh)	33	15	0			
,, expenses for quarter	7	17	3			
,, Farr's bill, rain gauge	10	6	10			
				51	19	1
W. T. Dymond (Falmouth)	66	5	0			
,, Mr. Squire's postages	1	8	3			
				67	13	3
R. Grant (Glasgow)	62	10	0			
Less tabulating scales supplied	0	4	0			
				62	6	0
H. Williams (Holyhead)				2	19	3
B. Stewart (Kew)	62	10	0			
,, examination of records	100	0	0			
,, sundries, per account	31	16	7			
,, Sugg, electrometer fittings	0	15	0			
				195	1	7
C. Clouston, Orkney				4	5	9
S. J. Perry, Stonyhurst	50	0	0			
,, Postages	1	3	10			
				51	3	10
T. Kerr, (Valencia), salary for March	20	16	8			
Expenses during quarter	42	6	3			
				63	2	11
G. T. Watson, Yarmouth				3	18	0
T. Adie, tabulating scales, &c.				11	7	0
J. H. Dallmeyer, lenses				44	2	0
Hopkin and Williams, chemicals	1	3	10			
,, ,,	0	11	2			
				1	15	0
W. Longman, copper plates				3	2	6
Malby and Sons, forms				26	0	0
R. W. Munro, S. R. instruments				217	7	0
D. Mac Andrew, erecting rain gauge, Aberdeen				10	10	2
S. Jeffery				*15	0	0
E. Magrath				*7	0	0
J. P. Cutts				*3	15	0
R. H. Curtis — Salaries and computations				8	6	8
F. Steveton				7	10	0
C. Stodart				*10	0	0
For telegraphy: Quarterly allowances, &c.						
J. Costello, Dover				3	12	2
J. Grant, Heart's Content				3	5	0
W. D. Penny, Navin				4	4	6
J. Merrifield, Plymouth				3	5	0
J. Hoar, Portsmouth, to 25th March				4	3	4
Sir W. Mitchell, Scilly ,,				3	2	7
J. Trotter, Thurso				3	15	0
T. Robinson, Yarmouth				3	5	0
F. Gaster				11	13	4
F. Brodie — Salaries and computations				4	10	0
G. G. Francis				4	5	0
For ocean meteorology:						
H. Toynbee, marine superintendent				33	6	8
L. P. Casella, "A" instruments	27	0	0			
,, "M O" ,,	20	11	6			
				47	11	6
Carried forward				1,306	6	6

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* Five weeks to the 1st April.

		£	s.	d.	£	s.	d.
Brought forward					1,306	6	6
B. Stewart, Kew, "A" verifications		0	12	0			
" "M O" "		19	3	0			
					19	15	0
J. R. Jones, Aberdeen agent					8	19	5
H. J. Smart, Liverpool agent					8	15	2
R. Rivière, binding pilot charts					4	10	0
W. Salmon	Salaries and computations				19	3	4
R. Strachan					†17	10	0
C. Harding					10	0	0
J. A. Curtis					* 7	0	0
W. G. James					* 7	0	0
J. W. M'Veagh					* 3	0	0
For office expenses:							
J. S. Harding, junr., on account					80	0	0
Total					£1,491	19	5

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* Five weeks to the 1st April.
† Including allowance for care of instruments.

The Committee then adjourned.

116, *Victoria Street, April* 3, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Col. Smythe.

Col. Walker was present by invitation of the Committee.

The Director was in attendance.

The Minutes of the two last meetings, March 20 and 27, were read and confirmed.

The Draft Reply to the India Office was considered, and an amended Draft was ordered to be sent to each member of the Committee for consideration on the 10th instant.

Read a letter from Capt. Toynbee, submitting excellent logs kept by two gentlemen who have already received the Pilot charts:

Capt. W. Watson, S.S. "Palmyra" and "Parthia." (Minutes, 1869, pp. 61, 113; 1870, p. 52.)

Capt. E. Heggum, ship "Czar." (Minutes, 1870, p. 83.)

Mr. Scott was instructed to convey the marked thanks of the Committee to Capts. Watson and Heggum.

The officers and clerks were re-appointed for the ensuing financial year, at the following salaries (*see* Minutes, 1867, p. 16; 1869, p. 38).

	£	s.	d.
R. H. Scott, Director of the Office	800	0	0
Capt. H. Toynbee, Marine Superintendent	400	0	0
W. Salmon, chief clerk	*240	0	0
J. S. Harding, jun., 1st senior clerk	*190	0	0

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* Increase in each of these cases, 10*l.* since last year.

	£	s.	d.
R. Strachan, 2nd senior clerk (with 50*l.* additional for care of instruments)	*170	0	0
F. Gaster, senior clerk	*150	0	0
C. Harding, 1st junior clerk	*130	0	0
R. H. Curtis, 2nd junior clerk	*110	0	0
F. C. Steventon, junior clerk	†100	0	0

The following scale of weekly salaries was approved:—

S. Jeffery	3	0	0
J. S. Harding, sen.	1	18	6
E. Magrath, increase 2*s.* per week	1	10	0
J. A. Curtis, „ „ „	1	10	0
W. G. James, „ „ „	1	10	0
F. Brodie, „ 3*s.* „	1	1	0
G. G. Francis, „ „ „	1	0	0
T. D. Bell, „ 3*s.* 6*d.* „	1	0	0
J. P. Cutts, „ 2*s.* 6*d.* „	0	17	6
J. W. McVeagh „ 2*s.* „	0	14	0
C. Stodart, mechanician	2	0	0

The Rev. T. Kerr was re-appointed director of Valencia Observatory, at a salary of 250*l.* per annum.

Reported—That an application for an imprest of 2,000*l.* had been forwarded to the Treasury.

Reported—That the account for Telegraphy for the five months, April to June 1870, amounting to 546*l.* 3*s.* 9*d.*, had been received from the Post Office on the 29th ult., and that accordingly a cheque had been drawn for the amount on the signature of Sir E. Sabine.

Also that the sum of 1,000*l.* had been transferred on his signature from the deposit account of the Committee to their current account.

The Committee then adjourned.

Victoria Street, April 10, 1871.

PRESENT:

Sir E. Sabine in the Chair.
Admiral Richards.

The Director was in attendance.

The Minutes of last meeting, April 3d, were read and confirmed.

The following reply to the India Office was adopted:

THE sources of information which the Committee have found most useful in enabling them to gain a preliminary insight into the meteorological requirements of India have been Herr v. Schlagintweit's Report, vol. iv., with the plates accompanying it, and Mr. Glaisher's Report on the Meteorology of India, in the Addenda to evidence taken before the Commissioners appointed to inquire into the sanitary state of the army in India, published in 1863.

From these it appears that while there is a very considerable number of meteorological stations, many of them of great importance and value, distributed over the country, there is, or was at the date of these reports, a great deficiency of organization. The Committee are glad to observe that the necessity for a better system is seriously felt in India, and that the Local Governments have already taken steps to institute systematic operations, as evinced by the several reports which you have had the kindness to forward from time to time, most especially those from Mr. Chambers, as regards not only his own observatory but the entire question propounded in your letter; and those from Bengal, the N.W. provinces, and the Punjaub. Of these latter the only document which refers at any length to details of organization is that first named, for Bengal, in which Mr. Blanford has classified his stations into three groups. In this particular he has in some degree followed the model of the Austrian system, as given by Dr. Jelinek in his "Anleitung zur Anstellung Meteorologischer Beobachtungen." Vienna, 1869.

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* Increase in each of these cases, 10*l.* since last year.
† Increase of 10*l.* since October 1869.
Allowance to be made to those clerks who attend at extra hours for telegraphy.

The only other European organizations comprehending a large area of territory are those in connexion with the K. Statistische Bureau in Berlin, and that at present being set in operation in Russia, by the advice of a committee of the Academy of St. Petersburg. This latter scheme is on a very large scale, as is requisite for the immense extent of the empire ; and it contemplates the establishment of 18 independent observatories, each with its own series of subordinate stations.

It would appear to the Committee that some plan should be set in operation in India, analogous to that just referred to, as in process of organization in Russia ; and such a proposal would be the more easily carried out owing to the existence of the five distinct establishments referred to in your letter, two of which are observatories of a very high class of scientific merit. In the opinion of the Committee five local central stations would probably be sufficient for India, the entire extent of the country being apportioned between them, for at present it appears that the subordinate stations are restricted to certain provinces, and that large tracts of country are wholly unrepresented.

In order to secure an uniform system of collecting meteorological data and of discussing the results, it appears to the Meteorological Committee to be desirable that a principal meteorological office should be established, with a scientific director at its head, to whom the superintendents of the five local meteorological central stations would be subordinate, and would transmit the data of the observations taken at the several stations under their supervision. The Committee are informed that the present superintendents, in all cases, have other duties to perform, which are liable to interfere with their freedom of action, and prevent their travelling about to inspect their stations and see that the observations are being carried on properly. The Committee would therefore recommend that to each superintendent should be given the services of an assistant for the express purpose of travelling about and inspecting the stations, a duty which should in their opinion be performed at least once a year if not more frequently.

The services of this officer might also be available for imparting a better organization to the numerous meteorological observatories which, they are informed, have been established for several years past at many stations other than those appertaining to the present meteorological districts, *e.g.*, at all places where there are military or civil hospitals.

The benefits to be expected from this practice, both as regards the information to be derived from it, the methodical organization of the operations, and the instruction and encouragement which it affords to outlying observers, cannot be put forward too strongly.

The Committee would suggest that many advantages might accrue from the establishment of the principal meteorological office in London. In such case the Government might secure for the Director the benefit of the advice and guidance of an unpaid Committee to whom he would be entirely responsible, as in the case of the Meteorological Office.

In the opinion of this Committee it would be most important that a complete set of instruments for the continuous automatic registration of meteorological phenomena should be supplied, if possible, to each of these five establishments referred to, or at least in every case in which the local district superintendent was able to hold out a prospect of being able to manage them properly ; as, for instance, at Colaba observatory, at Calcutta, and possibly at the college at Roorkee for the north-west provinces. The records obtained from these self-recording instruments would serve as a standard of comparison for the results of the several eye observations taken at the stations to be affiliated to them in the surrounding districts.

The system of continuous registration adopted by the Committee at their own observatories is *photographic* as regards the record of atmospheric pressure and temperature, and *mechanical* with reference to wind and rain, and it may be said to have proved itself thoroughly satisfactory.

A set of these instruments is at present at Colaba observatory, and, for the information of the Indian Government, it may be worth stating the cost, as regards preliminary outlay, for instruments and annual expenditure for light and chemicals.

The facts are taken from the observatory at Valencia (Ireland), which is lit not with gas but with paraffin.

	£	s.
Barograph and thermograph - - - - - - - -	140	12
Lenses - - - - - - - - - -	44	8
Anemograph - - - - - - - - -	75	15
Rain gauge - - - - - - - - - -	31	10
Tabulating instruments - - - - - - - -	22	10
Lamps, &c. - - - - - - - - -	22	0
Other fittings - - - - - - - - -	48	13
Testing instruments and instruction to observers - - - -	38	0
	£423	8

The annual expenditure for materials used averages about 40*l.*

The mode of discussion and publication of the results yielded by these observatories will of course form a most important subject of deliberation.

As regards the operations at the subsidiary stations, the Committee would impress on the Indian Government their very strong opinion that it would be most inadvisable to require a more extensive range of observations than can reasonably be expected from a single individual. There will then be every reason to hope and expect that numerous observers will themselves volunteer to register additional phenomena.

It will be very important to direct these desultory efforts so as to enable results of value to be elicited.

It seems hardly necessary to do more than draw the attention of the Indian Government to the importance of absolute uniformity as regards the instruments to be used and the methods of observing. If this cannot at once be attained, it is at least indispensable to have all the barometers and thermometers carefully tested by comparison with standards, as without these precautions all labour spent on observing will be almost totally thrown away.

As regards the special lines of investigation which it would be most desirable to pursue, the Committee would only couch their suggestions in the most general terms. The conditions of climate which are experienced over the whole of India differ so widely from each other according to the geographical situation of the respective stations, their distance from the sea coast, and their elevation above the sea level, that the questions which would have most local importance for an observatory like Madras, with reference to the agriculture and the sanitary conditions of the surrounding country, may prove to be comparatively unimportant for inland districts like the Punjaub and the N.W. provinces.

At all the stations the phenomena connected with the grand characteristics of the meteorology of Southern Asia, the monsoons and their periodical changes, will of course demand attention.

The accurate measurement of the rainfall, which is intimately connected with the monsoons, and is largely modified by forest denudation and the progress of cultivation generally, is another point well worthy of the careful notice which it has already attracted, as evinced by the numerous gauges erected over the country. This question is of far higher importance in India than in these islands, owing to the all but total dependence of immense tracts of country on artificial means of irrigation for the production of their staple crops.

The examination into the course of cyclones, and possibly into the causes which give rise to them, will not fail to maintain the interest which has already been excited on the subject, especially in Bengal.

These and all other useful objects of inquiry would be carefully considered by the proposed Director and Committee, whose especial duty it would be to aim at results, which should have a maximum value from the means at their disposal.

Read—A letter from Captain Toynbee, submitting excellent logs kept by—

Captain F. W. Banner, ship "Lady of the Lake," Minutes, 1870, p. 6.
Captain Clement Mossop, ship "Candahar," Minutes, 1870, p. 72.
Mr. C. W. Kennedy, chief officer of the S.S. "Scotia."

Mr. Scott was directed to present the Pilot Charts to Mr. Kennedy, and to express to Capts. Banner and Mossop, who have already received them, the marked thanks of the Committee for their continued services.

Reported—That, at the request of Mr. Scudamore, arrangements had been made for attendance at the office, at 8 A.M. on Mondays and at 8.30 A.M. on other week days.

Reported—That on the 31st of March, Penzance had been suppressed as a telegraphic reporting station, Scilly being substituted in its stead.

Reported—That since the beginning of the year the Underwriters Association at Liverpool had most liberally borne the entire expense of the telegrams forwarded to them.

Reported that Part IV. of the Quarterly Weather Report for 1869, completing that year, had been published on the 6th instant.

The Committee then adjourned.

116, *Victoria Street, April* 17, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Admiral Richards.

Colonel Smythe.

The Director was in attendance.

The Minutes of last meeting (April 10) were read and confirmed.

Reported—That the reply contained in the above Minutes had been forwarded to the India Office.

Submitted—Photographs of the thermograph screens at all the observatories, except Stonyhurst.

Mr. Scott was directed to have engravings of these screens inserted in the Quarterly Weatherly Report for 1870.

Mr. De La Rue reported that, having inquired into the alleged discrepancies in the testing of Hydrometers at Kew (Minutes, p. 3), he was disposed to think *primâ facie* that they mainly arose from the fact that the instruments were tested more carefully now than formerly.

Read—A letter from Captain Toynbee, submitting excellent logs kept by
Captain R. J. C. Tilmouth, ship "Peeress."
„ J. M'Donald Gray, ship "Speranza."
And recommending them for presentation copies of the Pilot Charts. Approved.

The Chairman stated that he proposed, with the approval of the Committee, to make the following communication to the Council of the Royal Society, viz.:—It being desirable to supply the vacancy in the Meteorological Committee occasioned by the lamented decease of Dr. Miller, he, as their Chairman, had consulted the other members of that Committee, and in accordance with their unanimous opinion, which was also his own, he recommended the name of Sir Charles Wheatstone, F.R.S., to supply the vacancy—Approved.

SUBMITTED.—The following STATEMENT respecting the RECORDS for March 1871 received from the self-recording Observatories, and which have been examined at Kew Observatory (See Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	None.		None.		10 hours Velocity* 14th.		10 hours Velocity and Direction.		None.		None.		None.	
Orientation verified	—		—		14th Correct.		—		31st correct.		24th correct.		1st correct.	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity	Direction.	Velocity.
Greatest difference	1·0	2·0	1·0	1·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign	0·4	0·7	0·2	0·4	0·2	0·4	0·1	0·5	0·1	0·2	0·2	0·3	0·3	0·7
Residual difference (—Kew)	—0·1	+0·2	—0·1	+0·1	—0·2	+0·1	0·0	+0·2	—0·1	+0·1	+0·1	—0·1	—0·1	—0·2
No. of errors discovered	0	0	0	0	0	1	1	1	0	0	0	0	1	13
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Fair.		Good.		Fair.		Good.	
Records deficient	47 hourly values.		None.		None.		3 hourly values.		None.		None.		1 hourly value.	
Result of 40 *Remeasurements* :—														
Greatest difference	0·0030		0·0050		0·0030		0·0040		0·0040		0·0040		0·0050	
Mean difference irrespective of sign	·0014		·0023		·0013		·0014		·0014		·0017		·0018	
Residual difference (—Kew)	—·0005		+·0014		—·0005		+·0001		+·0009		+·0003		+·0008	
Mean monthly difference between simultaneous barograph and barometer	·0015		·0026		·0019		·0028		·0022		·0015		·0023	
No. of errors discovered in entry of standard	0		0		0		0		0		0		0	
„ in calculating residual correction	0		0		1		1		0		0		1	
„ in applying residual correction	0		0		0		0		1		0		31	
„ in tabulation	0		0		0		0		0		0		0	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	15 dry, 20 wet.		11 wet bulb.		10 wet bulb.		8 dry, 21 wet.		5 wet.		‖ 25 dry, 29 wet.		6 dry, 22 wet.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·20	0·20	0·20	0·20	0·20	0·20	0·20	0·20	0·10	0·10	0.20	0·20	0·20	0·20
Mean difference irrespective of sign	·08	·10	0·10	·09	·07	0·10	0·12	0·12	0·06	·05	0·09	0·11	0·09	0·09
Residual difference (—Kew)	—·01	—·03	—·04	—·09	—·03	+·04	+0·07	—0·01	+·01	+·03	+·01	+0·06	+·04	—0·04
Mean monthly difference between simultaneous thermograph and thermometer	0·16	0·18	0·16	0·14	0·07	0·06	0·11	0·12	0·08	0·12	0·13	0·16	0·12	0·17
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	1	0	0	0
„ discovered by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ in maximum and minimum	1	1	4	2	0	0	0	0	0	0	0	0	2	0
„ in tabulation	0	†1	‡0	0	0	0	§1	0	0	0	0	0	0	1

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* The coupling pin of the velocity shaft gave way.

† Two days dry bulb curve retabulated.

‡ Two days dry and wet bulb curves retabulated.

§ Two days wet bulb curve retabulated.

‖ Principally caused by the sheet becoming detached from the cylinder.

The Committee then adjourned.

116, *Victoria Street, April* 24, 1871.

PRESENT:

Sir E. Sabine in the Chair.
Sir C. Wheatstone.

The Director was in attendance.

The Minutes of last meeting (April 17) were read and confirmed.

Reported—That an imprest for 2,000*l.* had been received from the Treasury and lodged in the Bank of England on the 21st inst.

Mr. Scott reported that having received intimation that Sir C. Wheatstone had been appointed a member of the Committee by the Council of the Royal Society, he had summoned him for the present meeting.

Reported—That letters had been received from Mr. Kingston, of Toronto, asking for information respecting the organization, &c., of the Meteorological Office, for his own guidance in devising a system for the Dominion of Canada, and that all necessary particulars had been supplied.—Approved.

Reported—That in the preparation of the numerical results for the several observatories for the year 1870, the following errors had been discovered in the records sent up from Kew as corrected:—

Valencia	-	Aug. 7. Max. temp. at 1 45 a.m.	should be	1 45 p.m.
„	-	„ 13, 9 p.m. Wet bulb, 66° 4′	„	61° 4′ *
„	-	„ 28, Min. temp. at 11 40 a.m.	„	11 40 p.m.
Armagh	-	May 13, Max. „ at 10 55 a.m.	„	10 55 p.m.
Glasgow	-	April 17, 7 p.m. Dry bulb, 52° 0′	„	57° 0′ *
„	-	Nov. 25, 2 a.m. Barom., 29 in.	„	28 in.
Aberdeen	-	March 30, 9 a.m. Wet bulb, 46° 7′	„	40° 7′ *
Stonyhurst	-	Jan. 3, 7 p.m. Dry bulb, 47° 3′	„	42° 3′
„	-	„ 14, 1 a.m. Wet bulb, 28° 7′	„	38° 7′ *
„	-	Feb. 7, Min., 26° 1′ -	„	36° 1′
„	-	July 6, „ 61° 5′ -	„	51° 5′
Kew	-	Jan. 18, 1 a.m. Barom., 30·358	„	30·558

In the four instances marked with an asterisk the same error appeared in the original and the subsidiary tabulations, so that it was probable that these two sets of readings had not been made independently of each other as they should be.

Mr. Scott was instructed to draw the attention of the respective observers to these latter errors, which could not easily have been detected at Kew.

Read—A letter from Capt. Toynbee, submitting excellent logs kept by,

Mr. J. T. Paterson, chief officer of the SS. "Moravian," Capt. J. Brown;
Capt. C. E. Le Poer Trench, ship "Newcastle;"

and recommending them for presentation copies of the Pilot Charts.—Approved.

Reported—That a copy of the minutes of the Committee for 1870 had been sent as usual to the Board of Trade and the Royal Society respectively.

Submitted—An application from Capt. Hutchison, harbour master of Kingstown, for a fishery barometer, to be erected in the porch of the Sailors' Reading Room.—Granted.

Reported—That applications for telegraphic weather intelligence from the following places having been approved by the Board of Trade, they have been added to the list of stations warned:—

Burntisland.
Newhaven.
Port Isaac.
St. Andrew's.
Ramsay.
Rothesay.

Also that an application from Alderney has been declined, for want of funds for the erection of a signal staff, &c.

Submitted—The following statement of

ACCOUNTS PAID, AND LIABILITIES, to 31st March 1871.

——	Paid.			Estimated Liabilities.		
	£	s.	d.	£	s.	d.
OFFICE :—						
Salaries - - -	1,195	7	0	—		
Rent, fuel, &c. - -	473	12	1	—		
Contingencies - - -	313	19	9	—		
LAND METEOROLOGY :—						
Expenses at observatories -	2,613	17	3	38	4	6
New instruments for ditto -	978	17	3	203	4	6
Computations - - -	782	17	3	—		
Telegraphy - - -	850	19	2	1,053	13	7
Inspections, &c. - -	160	19	8	—		
Computations - -	382	1	6	—		
OCEAN METEOROLOGY :—						
Marine Superintendent -	400	0	0	—		
Instruments, Admiralty -	103	4	6	6	5	6
Ditto Mercantile Marine -	648	5	2	68	15	5
Computations and care of instruments - -	856	7	0	—		
Totals - -	9,760	7	7	1,370	3	6

Grand Total - - £11,130 11*s*. 1*d*.

Resolved—That Mr. De La Rue and Mr. Spottiswoode be requested to act as auditors of the accounts for the financial year 1870–71.

The following cheques were drawn :—

					£	s.	d.
For Office:							
R. H. Scott -	Salaries and wages - - -				66	13	4
J. S. Harding, jun.	,, ,, - - - -				15	16	8
J. S. Harding, sen.	,, ,, - - - -				*7	14	0
T. D. Bell -	,, ,, - - - -				*4	0	0
For Observatories:							
T. Kerr, Valencia,	Salary - - - - -				20	16	8
Bates, Elliot & Co.,	Photo. Trays - - - -				3	15	6
R. & J. Beck,	Zinc plates - - - - -	8	0	2			
,,	Removing Pantagraph, &c. - -	1	1	0			
,,	Repairs to do. - - -	1	2	6			
,,	Models of Bagging Inst. - -	4	12	6			
					14	16	2
S. Jeffery -	Salaries and computations - - -				*12	0	0
E. Magrath	,, ,, - - - -				*6	0	0
J. P. Cutts	,, ,, - - - -				*3	10	0
R. H. Curtis	,, ,, - - - -				9	3	4
F. C. Steventon	,, ,, - - - -				8	6	8
C. Stodart -	,, ,, - - - -				*8	0	0
For Telegraphy:							
Postmaster General,	private wire - - - -				22	0	0
S. M. Clare,	Submarine Co., February - - -				9	5	2
F. Gaster -	Salaries and computations - - -				†14	6	5
F. Brodie -	,, ,, - - - -				*†4	18	0
G. G. Francis	,, ,, - - - -				*†4	3	6
For Ocean Meteorology:							
H. Toynbee,	Marine Superintendent - - - -				33	6	8
Negretti & Zambra,	" A " Instruments - -	1	5	6			
,, ,,	"M.O." ,, - -	1	16	0			
					3	1	6
	Carried forward - - -				271	13	7

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* Four weeks to the 29th.

† Including allowance for extra attendance.

	£	s.	d.
Brought forward	271	13	7
E. Higgs, packing cases	5	9	0
Williams & Norgate, Pilot Charts	10	5	0
W. Salmon - Salaries and computations	20	0	0
R. Strachan - ,, ,,	*18	6	8
C. Harding - ,, ,,	10	16	8
J. A. Curtis - ,, ,,	†6	0	0
W. G. James - ,, ,,	†6	0	0
J. W. McVeagh ,, ,,	†2	16	0
For Office Expenses:			
J. S. Harding, jun., on account	80	0	0
Total	£ 431	6	11

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* Including allowance for care of instruments.
† Four weeks to the 29th.

The Committee then adjourned.

116, *Victoria Street, May* 1, 1871.

PRESENT:

Mr. Galton in the Chair.

Mr. Gassiot. | Sir E. Sabine.

The Director was in attendance.

The Minutes of last meeting (April 24) were read and confirmed.

Submitted—The following Report, which was ordered to be printed, the instrument to be returned to the office from Kew:—

On the COMPARISON of the REVOLUTION of the CUPS attached to Mr. GALTON'S SMALL ANEMOMETER with that of the KEW STANDARD INSTRUMENT, at Kew, at different times during the years 1870 and 1871.

The Minutes of the Committee for 1870 contain, at p. 83, a report on the above-named subject, founded on a short series of readings taken from the two instruments; but as the number of observations there discussed was small, the following results from a more extended series are now submitted.

The first results are from a comparison of the two instruments during the time that they were in the enclosure of Kew Observatory, the observations being made between the 18th June and 31st December 1870. During this time the total number of miles of wind which passed over Kew from *all* directions was—

As registered by the Standard.	Registered by Mr. Galton's.	Difference K—G.	Per-centage of Loss by Mr. Galton's.
27,258	23,574	3,684	13·5

In order to test the accuracy of exposure these values were analyzed, for each two points of direction, with the following results:

Direction of Wind.	No. of Miles registered.		Difference.	Per-centage of Loss by Mr. Galton's Instrument.
	Kew.	Galton.		
North.	365	323	42	11·5
N.N.E.	2,211	1,913	298	13·5
N.E.	1,894	1,419	475	25·1
E.N.E.	1,860	1,394	466	25·1
East.	1,103	813	290	26·3
E.S.E.	163	122	441	25·2
S.E.	140	103	37	26·4
S.S.E.	125	104	21	16·8
South.	367	336	31	8·4
S.S.W.	1,744	1,567	177	10·4
S.W.	4,933	4,504	429	8·7
W.S.W.	2,534	2,347	187	7·4
West.	705	654	51	7·2
W.N.W.	1,072	980	92	8·6
N.W.	1,585	1,401	184	11·6
N.N.W.	1,224	1,104	120	9·8
Variable.	5,233	4,490	743	14·2
Totals and average	27,258	23,574	3,684	*13·5

* Obtained from totals at foot of columns "Kew" and "Difference."

From the above figures it is evident (as mentioned in the Report above referred to) that the instruments shelter each other during the prevalence of easterly and westerly winds, but that Mr. Galton's instrument *always* registers considerably less wind than the Kew Standard.

In January 1871 the two instruments were placed in the open park at Richmond, at a considerable distance from the observatory, and another series of readings was taken, the results of which are as follow:

The total miles of wind from all directions was—

Registered by the Kew Standard.	By Mr. Galton's Instrument.	Difference K—G.	Per-centage of Loss by Mr. Galton's.
14,620	12,668	1,952	13·4

An analysis of the above figures for each two points of direction is given in the following table:

Direction of Wind.	No. of Miles registered.		Difference.	Per-centage of Loss by Mr. Galton's Instrument.
	Kew.	Galton.		
North.	542	470	72	13·3
N.N.E.	1,294	1,110	184	14·2
N.E.	343	288	55	16·0
E.N.E.	717	607	110	15·3
East.	408	354	54	13·2
E.S.E.	190	170	20	10·5
S.E.	638	561	77	12·1
S.S.E.	202	177	25	12·4
South.	630	545	85	13·5
S.S.W.	750	660	90	12·0
S.W.	5,451	4,724	727	13·3
W.S.W.	982	860	122	12·4
West.	222	195	27	12·2
W.N.W.	439	384	55	12·5
N.W.	185	161	24	13·0
N.N.W.	268	232	36	13·4
Variable.	1,359	1,170	189	13·9
Totals and average	14,620	12,668	1,952	*13·4

* Obtained from totals at foot of columns "Kew" and "Difference."

In this part of the investigation the number of miles of wind from points between N.N.E. and S.E. is too small to give very reliable values for *each* of the directions, but the *average* loss for those points is 13·9 °/o, agreeing *very* nearly with that for the other directions.

It would appear, therefore, that from some cause or other in the construction of the instrument, Mr. Galton's anemometer registers about 13 *per cent.* less wind than the Kew Standard.

In the former Report an investigation was made to decide whether this loss varied with different velocities of wind, but the result tended to prove that on the whole no such variation occurred.

Read—A letter from Capt. Toynbee, submitting excellent logs kept by three gentlemen who have already received the Pilot Charts:

Capt. H. P. Wight, ship "Gosforth" (Minutes, 1868, p. 60; 1869, p. 60; 1870, p. 58).
Capt. W. H. Smith, R.N.R., s.s. "Peruvian" (Minutes, 1870, pp. 1 and 76).
Capt. E. J. Blake, ship "Gilbert Thompson" (Minutes, 1870, p. 60).

Resolved—That the marked thanks of the Committee be expressed to the respective observers for their valuable observations.

Sir E. Sabine drew the attention of the Committee to two methods now under Sir C. Wheatstone's consideration, for determining the hygrometrical condition of the air.

Resolved—That Sir C. Wheatstone be requested to communicate in writing his views on the subject to the Committee, together with a statement of the probable cost of making and testing the instruments, and also of the extent to which either or both of them could be rendered self-recording, in order that the experiments should be tried.

Reported—That in consequence of the increased rate at which Meteorological Registers are now returned from ships, Mr. C. Harding has been directed to undertake the requisite examination of each log received, and, in order not to interfere with the ordinary work of the Marine Room, it is proposed that he should attend at 9 instead of 10 o'clock daily. Payment for this work to be in proportion to his regular salary.—Approved.

The Committee then adjourned.

116, *Victoria Street, May* 29, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. Galton. | Sir C. Wheatstone.

The Director was in attendance.

The Minutes of last meeting (May 1) were read and confirmed.

Sir C. Wheatstone stated, with reference to the resolution contained in those Minutes, that he proposed to construct experimental instruments and submit them to the Committee.

Read—A reply from the India Office, stating that copies of the letter from the Committee (Minutes, p. 18) had been forwarded to India for the consideration of the Indian Government.

Submitted—The following Report from the Auditors, which was ordered to be printed on the Minutes:—

METEOROLOGICAL OFFICE REVENUE and EXPENDITURE ACCOUNT for the year ended the 31st March 1871.

Dr. REVENUE.

	£	s.	d.
To Parliamentary vote	10,000	0	0
Balance from year 1869–70	1,486	14	1
M. C. Ste. Claire Deville	3	10	0
J. W. Jarrett	4	10	0
G. Dornbusch	10	0	0
H. Lee and Sons	2	10	0
W. W. Rundell	3	0	0
J. W. Moore	3	10	0
Captain D. Gray	1	1	11
Agent for Crown Colonies	13	18	0
Sale of old Signal gear	0	1	0
Interest on deposit account	58	9	10
	£11,587	4	10

EXPENDITURE. *Cr.*

	£	s.	d.	£	s.	d.
Office.						
By Salary of Director	800	0	0			
Do. two Clerks	230	6	6			
Office keeper and Messenger	165	0	6			
				1,195	7	0
Rent of office	443	12	9			
Fuel and gas	29	19	4			
Furniture and fittings	96	16	10			
Postage	92	14	2			
Printing, &c.	28	3	6			
Attendance, cleaning and other contingencies	96	5	3			
				787	11	10
Land Meteorology.						
Expenses at observatories	2,613	17	3			
New instruments for do.	978	17	3			
Computations	782	17	3			
				4,375	11	9
Telegraphy	850	19	2			
Inspections and other expenses	160	19	8			
Computations	382	1	6			
				1,394	0	4
Ocean Meteorology.						
Marine Superintendent	400	0	0			
Supply and return of instruments:						
Admiralty	103	4	6			
Mercantile Marine	648	5	2			
Computations and care of instruments	856	7	0			
				2,007	16	8
				9,760	7	7
Cash in hand	42	17	2			
Advance to Valencia Observatory	50	0	0			
Bank of England account	559	13	10			
London and Westminster Bank	1,174	6	3			
				1,826	17	3
				£11,587	4	10

Examined and compared with the vouchers and found correct.

1 May 1871.

(Signed) WARREN DE LA RUE, W. SPOTTISWOODE, } Auditors.

Statement showing **Balance** on April 1st, 1871, and an estimated amount of **Liabilities** payable from the same.

	£	s.	d.	£	s.	d.	£	s.	d.
Balance on 1st April							1,826	0	0
Observatories—Current expenses				38	0	0			
Do., New instruments:									
Vapour tension instruments	80	0	0						
Bagging, do.	80	0	0						
Other instruments	43	0	0						
				203	0	0			
Telegraphy—from July 1870				1,054	0	0			
Admiralty instruments				6	0	0			
Mercantile Marine do.				69	0	0			
							1,370	0	0
Leaving a probable surplus of							£456	0	0

Submitted—Proofs of the Annual Report, 1870, which was approved, with verbal alterations.

Resolved—That the Report be forwarded to the Board of Trade for presentation to Parliament.

Submitted—The following Report:—

I have to report that I visited the observatory at Kew on the 5th instant, and in the absence of Dr. Stewart went over the building, &c. with Messrs. Whipple and Baker. I am glad to say that I found everything in good order. The spare set of instruments have been delivered at Kew, and are being tested there by Mr. Beckley.

On the 16th I visited Falmouth, and found the observatory in a satisfactory condition. The self-recording rain-gauge has been erected in Mr. Dymond's garden, as already mentioned in your Minutes.

The telegraphic reporting station of Plymouth was visited on the 16th, and I am very glad to report a very satisfactory improvement in the way in which the observations are conducted, as might be expected from Mr. Merrifield's experience as a meteorological observer. The position of the thermometer and rain-gauge is not all that could be wished, but a better situation is not available.

On the 18th I visited the new station at St. Mary's, Scilly, which is in very good condition. The observer, W. Thomas, is a very careful man, and well practised in observing the weather, having been at sea all his life. The instruments are well placed, and the observations of wind and sea are taken from Peninnis Head, where Thomas is stationed during the day, reporting ships' signals for the Shipping Gazette. In consideration of the distance between this station and the guard room on the Garrison Hill where the instruments are placed, I have to submit that an extra allowance of 1*s.* 6*d.* per week may be made for the duty of reporting at Scilly. Similar exceptions are in existence—*e.g.*, at Aberdeen.

On the 26th I visited Yarmouth, and found the instruments in good condition, excepting the wet bulb thermometer, which was not properly mounted. In other respects the reports are fairly satisfactory.

Robert H. Scott.

The increase of allowance of 1*s.* 6*d.* per week to the Observer at Scilly was sanctioned.

Read—The following letter:—

Gentlemen,

Inasmuch as the recess of the Royal Society is approaching, and the meetings of this Committee will ere long be suspended for a time, I venture to draw your attention to the relations between you and the Kew Committee of the British Association, with a view to your addressing a letter to that Committee without unnecessary delay, in case you should approve of taking such a step.

The present relations between Kew Observatory and this office are specified in the subjoined extracts from your Minutes:—

Extract from Minutes of Committee, dated the 12th November 1869.

"Resolved—That this Committee are prepared to make the following proposals to the Council of the British Association:—

"Either, I. That Kew be continued as one of the ordinary self-recording observatories, in which case the Committee would be prepared to allot to it annually 250*l.*

"Or, II. In addition to the foregoing work, that Kew be maintained as the central observatory for examination of the records and tabulations from all the observatories, in which case the Committee would be prepared to allot a further annual sum of 400*l.*

"They would further wish to retain the services of Mr. Beckley when required, the Committee defraying his expenses and paying his salary while in their employment.

"All extra work done, such as instruction of observers, trial of new instruments, construction of models, or experiments of any kind, to be paid for extra, as far as possible according to furnished and accepted estimates.

"The verification of instruments belonging to the Meteorological Office to be carried on at Kew on the same terms as heretofore."

EXTRACT from Minutes of Committee, dated the 20th December 1869.

"Extract from the Minutes of the Kew Committee, 11th December 1869, approved by the Council of the British Association on the same day.

"The consideration of the relations between the Kew Observatory and Meteorological Office were considered. (Vide Minutes, 12th November.)

"Resolved—That it be recommended to the Council that Kew be continued as one of the ordinary self-recording observatories of the Meteorological Committee, that body allowing it annually 250*l.*

"At present this work consists of obtaining traces of the barograph, thermograph, and anemograph, and tabulating these, along with observations of rain-gauge and absolute hygrometer.

"That in addition to the foregoing work, Kew be maintained as the central observatory for examination of the records and tabulations from all the other observatories, for the further sum of 400*l.* per annum.

"The method of examination not to differ materially from that at present adopted and described in the last report of the Meteorological Committee.

"The Committee see no objection to continue to allow to the Meteorological Committee the occasional services of Mr. Beckley when required, the Meteorological Committee defraying his expenses and paying his salary while in their employment.

"The Committee see no difficulty in continuing to undertake, from time to time, extra work for the Meteorological Committee, such as instruction of observers, trial of new instruments, construction of models, and experiments, the expense to be defrayed by the Meteorological Committee, upon estimates, whenever possible.

"The verification of instruments belonging to the Meteorological Office to be carried on at Kew on the same terms as heretofore.

"This arrangement not to take effect until 31st March 1870.

"Should this report be approved by the Council a copy to be forwarded to the Meteorological Committee."

The fourth paragraph of the second extract provides for the examination of the records from the outlying observatories being conducted on the principles described in your Report for 1868. In other words, the Kew Committee undertake, for the sum of 400*l.*, that *the records shall be finally examined and signed by the Director of the central observatory.* During the last eight months there has not been a resident Director at Kew, and the returns have been signed by one of the assistants.

I cannot consider this arrangement satisfactory, and should feel some uneasiness in leaving London for my summer vacation in August if matters had not by that time been placed on a better footing.

If it should meet your approval, I entertain no doubt that the examination of the records *could* be conducted in this office, under my own superintendence, and that the work would be at least as satisfactorily performed as at present, and at a cost not exceeding 300*l.*, or at most 350*l.*, instead of 400*l.* a year.

If, however, you deem it advisable to maintain the existing payment to Kew for work performed, I would most respectfully submit to you that you should request the Kew Committee to make such arrangements as should ensure, without loss of time, the regular daily attendance at Kew of a responsible superintendent to take charge at least of the meteorological observations, and the examination of the records from the outlying observatories, for which services the considerable sum of 650*l.* per annum is allocated to Kew Observatory out of the annual grant to this office.

I am, &c.,
ROBERT H. SCOTT.

Read—A letter from the Westminster Improvement Commissioners, offering two rooms on the first floor of No. 113, Victoria Street, at an annual rent of 70*l.* per annum, with 1*l.* 1*s.* for gas on the stairs.

Mr. Scott was instructed to secure this additional accommodation.

Submitted—An application for a fishery barometer for Kirkwall.—Granted.

Read—A letter from Capt. Toynbee, submitting excellent logs kept by Capt. T. C. Kerr, ship "Durham;" Capt. Jas. Wylie, s.s. "Austrian;" log kept by Mr. J. C. Menzies; and recommending them for presentation copies of the Pilot Charts. Also a log kept by the late Capt. J. M'Donald, of the s.s. "Europa," who was unfortunately swept overboard by a sea, with both his officers, during the first voyage on which he was observing for the office.

Resolved—That the Pilot Charts be presented as recommended, and that a letter be written to the representatives of Capt. M'Donald, expressing the sincere thanks of the Committee for his observations, and their regret at his loss.

Read—The following letter:—

Armagh Observatory, 4th May 1871.

I THINK the specimen curves which you have sent me are a great improvement on the former ones. They are beautifully distinct, and the scale is quite sufficient to convey all needful information. The velocity lines in particular are a great improvement. Notwithstanding their want of parallelism, their extremities form a sufficient approximation to the velocity curve, of which I spoke in my last letter to you, to make an exact delineation of that curve unnecessary.

(Signed) T. R. ROBINSON, D.D.

Resolved—That a copy of this letter be inserted in the Annual Report, Dr. Robinson having already sanctioned this step.

Submitted—The following notice of Mr. Galton's vapour tension machine :—

VAPOUR TENSION MACHINE.

The accompanying curves of vapour tension were reduced by Wagner's Pantagraph in the usual way, from traces mechanically made on long zinc templates by the new machine, designed by Mr. Galton, and now at work in the office.

The traces were made by the temporary establishment of a mechanical connexion between two of its independent movements, for the purpose of ascertaining the degree of precision with which the instrument will do its appointed work.

The subjoined table gives a series of measurements made from the zinc templates, ranged side by side, with the corresponding numbers taken from Glaisher's Hygrometrical Tables, 5th edition.

Temp.	Diff.	Instl. Reading.	Tabular Reading.	Error.	Temp.	Diff.	Instl. Reading.	Tabular Reading.	Error.
90°	0°	1·400	1·411	—·011	60°	8°	·297	·299	—·002
	4°	1·145	1·151	—·006		10°	·256	·259	—·003
	10°	·830	·833	—·003	50°	0°	·355	·361	—·006
	16°	·590	·595	—·005		2°	·315	·309	+·006
	20°	·470	·473	—·003		4°	·263	·265	—·002
80°	0°	1·020	1·023	—·003		6°	·230	·226	+·004
	4°	·820	·820	·000		8°	·193	·191	+·002
	12°	·515	·513	+·002	40°	0°	·248	·247	+·001
	18°	·360	·357	+·003		2°	·210	·207	+·003
70°	0°	·732	·733	—·001		4°	·170	·172	—·002
	2°	·650	·651	—·001	35°	0°	·203	·204	—·001
	6°	·505	·508	—·003		2°	·165	·164	+·001
	10°	·390	·392	—·002	30°	0°	·170	·167	+·003
	14°	·300	·302	—·002		2°	·120	·116	+·004
60°	0°	·515	·518	—·003	25°	0°	·138	·135	+·003
	2°	·455	·453	+·002		2°	·080	·074	+·006
	4°	·390	·395	—·005	20°	0°	·110	·108	+·002
						2°	·060	·051	+·009

The mean error of 35 readings is accordingly ·003 in., and the extreme error is — ·011 at the extreme limit of the scale.

The accuracy attained is therefore fully equal to that of any of our graphical representations.

Resolved—That this memorandum, with the plate, be inserted in the Annual Report.

Submitted the following Statement respecting the Records for April 1871, received from the Self-Recording Observatories, and which have been examined at Kew Observatory (*see* Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action - - - - - -	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient - - - - -	None.		None.		None.		4 hours V. and D.		None.		None.		1 hour velocity.	
Orientation verified - - - - -	—		—		April 13th.		April 27th.		April 26th.		April 28th.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference - - - - -	1·0	1·0	1·0	1·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	2·0
Mean difference irrespective of sign - -	0·2	0·5	0·1	0·4	0·1	0·5	0·2	0·7	0·1	0·4	0·2	0·6	0·3	0·6
Residual difference (— Kew) - - -	+0·1	0·0	0·0	+0·1	+0·1	0·0	+0·1	−0·2	0·0	−0·3	0·0	−0·2	+0·1	−0·3
No. of errors discovered - - -	None.	None.	None.	None.	None.	None.	3	0	None.	None.	None.	None.	0	12
BAROGRAPH :—														
Action - - - - - -	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography - - - - - -	Good.		Good.		Good.		Indifferent.		Good.		Good.		Good.	
Records deficient - - - - -	None.		None.		None.		1 hour lost.		None.		None.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference - - - - -	·0030		·0050		·0050		·0050		·0040		·0050		·0050	
Mean difference irrespective of sign - -	·0008		·0018		·0015		·0020		·0019		·0017		·0022	
Residual difference (— Kew) - - -	+·0001		+·0010		—·0006		+·0005		+·0003		—·0003		—·0009	
Mean monthly difference between simultaneous barograph and barometer - - -	·0012		·0028		·0020		·0024		·0021		·0012		·0020	
No. of errors discovered in entry of standard -	0		0		0		0		1		0		4	
„ in calculating residual correction - -	0		0		0		0		0		1		1	
„ in applying residual correction - -	0		1		0		1		1		0		24	
„ in tabulation - - - -	0		0		0		0		0		0		0	
THERMOGRAPH :—														
Action - - - - - -	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography - - - - - -	Good.		Good.		Good.		Fair.		Good.		Good.		Good.	
Records deficient - - - - -	5 hours wet.		None.		13 hours wet.		43 hours wet.		1 dry and 1 wet.		2 hours wet.		None.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference - - - - -	0·30	0·30	0·20	0·20	0·20	0·20	0·20	0·20	0·20	0·10	0·20	0·20	0·20	0·20
Mean difference irrespective of sign - -	·11	·12	·10	·10	·10	·10	·10	·10	·06	·06	·11	·09	·13	·09
Residual difference (— Kew) - - -	+·05	+·01	+·04	—·05	·00	+·01	+·04	+·01	—·02	+·01	—·05	—·04	—·06	—·09
Mean monthly difference between simultaneous thermograph and thermometer - -	0·18	0·15	0·15	0·17	0·06	0·06	0·10	0·08	0·09	0·12	0·14	0·17	0·13	0·17
No. of errors discovered in entry of standard -	0	0	0	0	0	0	0	0	0	0	0	0	1	0
„ discovered by subsidiary measurements -	0	1	0	1	0	0	3	3	0	0	0	0	0	0
„ in maximum and minimum - -	1	0	1	1	0	0	0	2	0	0	3	5	2	6
„ in tabulation - - - -	0	0	*		0	0	0	0	0	0	0	0	0	0

* 1½ days dry bulb and 3½ days wet bulb have been retabulated at Kew.

Reported—That a cheque for 25*l.* for office expenses had been drawn by Sir E. Sabine on the 12th inst.

The following cheques were drawn :—

			£	*s.*	*d.*
For Office:					
R. H. Scott	Salaries and wages		*66	13	4
J. S. Harding, jun.			15	16	8
J. S. Harding, sen.			*7	14	0
T. D. Bell			*4	0	0
C. Gillman, gas, No. 116		1 14 0			
		1 2 8			
			2	16	8
For Observatories:					
T. Kerr, Valencia, salary			20	16	8
W. Longman, copper plates			2	16	3
S. Jeffery	Salaries and computations		*12	0	0
E. Magrath			*6	0	0
J. P. Cutts			*3	10	0
R. H. Curtis			9	3	4
F. C. Steventon			8	6	8
C. Stodart			8	0	0
For Telegraphy:					
S. M. Clare, Submarine Company, March			10	4	11
J. & C. Walker, outline charts			3	15	0
F. Gaster	Salaries and computations		†16	2	10
F. Brodie			*† 5	14	11
G. G. Francis			*† 4	4	8
For Ocean Meteorology:					
H. Toynbee, Marine Superintendent			33	6	8
W. Salmon			20	0	0
R. Strachan			‡18	6	8
C. Harding			†11	9	5
J. A. Curtis			*6	0	0
W. G. James			*6	0	0
J. W. McVeagh			*2	16	0
For Office Expenses:					
J. S. Harding, jun., on account			90	0	0
	Total		£395	14	8

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* Four weeks, to the 27th.
† Including allowance for extra attendance.
‡ Including allowance for care of instruments.

The Committee then adjourned.

116, *Victoria Street, June* 5, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue. | Admiral Richards.
Mr. Galton. | Colonel Smythe.
Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, May 29, were read and confirmed.

Reported—That the Report for 1870 had been forwarded to the Board of Trade.

Reported—That the daily weather report had been supplied to the Sailors' Home, Yarmouth.

Mr. Scott reported that on a recent visit to Truro he had found that the fishery barometer at that town was not consulted by the public, and seemed to be of little use, so that he had directed it to be recalled.—Approved.

A conversation arose relative to Kew, and Mr. Scott was requested to ascertain from the officials the amount paid for extra work during the last five years.

The Committee then adjourned.

116, *Victoria Street, June* 19, 1871.

PRESENT.

Sir E. Sabine in the Chair.

Mr. De La Rue. | Mr. Gassiot.
Mr. Galton. | Mr. Spottiswoode.
Sir Charles Wheatstone.

The Director was in attendance.

The Minutes of last meeting, June 5, were read and confirmed.

Mr. Scott submitted a memorandum relative to the extra work, &c., at Kew, as directed at last meeting, and after some discussion it was resolved—

That the relations between Kew observatory and this office be taken into consideration on the 3rd of July next.

Read a letter from the Board of Trade, notifying to the office the establishment of a system of weather signals on the coast of Portugal. The signals employed are the drum and cone.

Mr. Scott drew the attention of the Committee to certain errors which had been detected either in the fiducial lines, &c., drawn on the curves at Kew, or in the original tabulations, and he was instructed to investigate the matter in the hope of rendering these defects less frequent.

Mr. Galton reported that an alteration was requisite in his Vapour Tension Instrument, and he was authorised to have this carried into effect at a cost not exceeding 5*l*.

Submitted—The following **Statement** respecting the **Records** for May 1871 received from the self-recording Observatories, and which have been examined at Kew Observatory (See Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	None.		None.		None.		None.		24 hours Direction		16 hours Velocity and Direction.		16 hours Direction and 1 hour Velocity.	
Orientation verified	—		—		May 17th.		—		31st correct.		26th correct.		8th Good.	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity	Direction.	Velocity.
Greatest difference	1·0	2·0	1·0	1·0	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·2	0·6	0·2	0·5	0·2	0·3	0·2	0·6	0·1	0·3	0·2	0·4	0·2	0·5
Residual difference (—Kew)	+0·1	+0·2	—0·1	+0·1	—0·1	—0·1	+0·1	—0·2	0·0	0·0	—0·1	0·0	—0·1	—0·1
No. of errors discovered	0	1	0	0	0	0	1	0	0	0	1	1	0	1
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Fair.		Good.		Good.		Indifferent.		Good.		Good.		Good.	
Records deficient	None.		None.		None.		9 hours lost.		25 hours lost.*		None.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference	0·0040		0·0050		0·0040		0·0040		0·0040		0·0040		0·0040	
Mean difference irrespective of sign	·0015		·0024		·0016		·0013		·0014		·0018		·0015	
Residual difference (—Kew)	+·0003		+·0017		+·0005		—·0005		+·0006		·0000		+·0004	
Mean monthly difference between simultaneous barograph and barometer	·0014		·0025		·0018		·0023		·0026		·0014		·0025	
No. of errors discovered in entry of standard	0		0		0		2		1		0		1	
„ in calculating residual correction	0		0		1		0		0		0		4	
„ in applying residual correction	0		0		0		1		0		0		11	
„ in tabulation	0		0		0		0		0		0		28	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Fair.		Good.		Good.		Good.	
Records deficient	None.		1 wet bulb.		16 wet bulb.		11 wet, 6 dry.		25 wet, 1 dry.		2 wet bulb.		2 wet bulb.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·20	0·20	0·30	0·30	0·20	0·20	0·20	0·30	0·10	0·20	0·20	0·30	0·20	0·30
Mean difference irrespective of sign	·10	·12	0·13	·16	·09	0·09	0·11	0·13	0·06	0·07	0·10	0·12	0·10	0·12
Residual difference (—Kew)	—·04	—·01	+·13	+·16	+·01	+·09	—0·01	0·00	+·06	+·04	+·05	+0·03	—·06	—0·09
Mean monthly difference between simultaneous thermograph and thermometer	0·22	0·16	0·15	0·18	0·10	0·09	0·11	0·13	0·12	0·14	0·15	0·17	0·16	0·23
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	1	0	0	0
„ discovered by subsidiary measurements	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ in maximum and minimum	0	0	0	0	0	0	0	0	0	0	0	0	3	2
„ in tabulation	†0	1	‡0	0	0	0	§0	0	0	0	0	1	0	0

* May 17th-19th. Trace lost by breakage of cylinder clamp.

† Two days curve retabulated at Kew.

§ One and half days wet bulb retabulated at Kew.

‡ Two and half days dry and wet bulb curve retabulated at Kew.

The Committee then adjourned.

116, *Victoria Street, June* 26, 1871.

PRESENT:

Sir E. Sabine in the Chair.
Mr. De La Rue. | Mr. Spottiswoode.
Sir C. Wheatstone.

The Director was in attendance.

The Minutes of last meeting (June 19) were read and confirmed.

Reported—That the Committee of the "Worcester" training ship had applied for a set of instruments for the instruction of the cadets (Minutes, 1870, pp. 1 and 5). Mr. Scott was instructed to accede to the request, and issue the instruments.

Mr. Scott reported that he had learnt that Mr. Wm. Lawrence, schoolmaster at Boddom, near Fitful Head, in the Shetland Isles, would be competent to undertake the duty of sending daily telegraphic reports from that station of the telegraphic line (Minutes, p. 8). He was authorised to establish the station accordingly.

Submitted—The following report:

June 26, 1871.

I BEG to report that I inspected the reporting station at Portsmouth on the 24th inst.

The instruments have been placed, by permission of Professor Main, at the Royal Naval College. The thermometers are erected in a garden, with a due N. by W. aspect. The rain-gauge is also in the garden, and both it and the thermometers are well exposed.

The observer is Mr. Joseph Hoar. He had gone out for the afternoon when I called, so that I did not see him. His register was well kept, and the station seems in a satisfactory condition.

ROBERT H. SCOTT.

Reported—With reference to the resolution as to increased accommodation in No. 113, Victoria Street (Minutes, p. 30), that the second floor in No. 116 had become vacant, and that accordingly it was proposed to take this latter floor instead of the entire first floor in No. 113, so as to have the whole office under one roof. The proposed change would not affect the amount of rent to be paid.—Approved.

Mr. Scott reported that an additional imprest would be required, and was instructed to apply for 1,000*l.*

Resolved—That the sum of 500*l.* be transferred from the deposit account of the Committee in the London and Westminster Bank to their current account in the Bank of England.

The following cheques were drawn:—

					£	*s.*	*d.*
For Office:							
R. H. Scott	Salaries and wages				66	13	4
J. S. Harding, jun.					15	16	8
J. S. Harding, sen.					*9	12	6
T. D. Bell					*5	0	0
C. W. Jacques, rent, No. 116		93	2	6			
„ „ No. 113		22	15	3			
„ alterations, No. 116		3	12	6			
					119	10	3
For Observatories (Quarterly Allowances, &c):							
D. Thomson (Aberdeen)		62	10	0			
less Anemograph Forms		0	18	9			
		61	11	3			
„ Expenses per account		2	16	8			
					64	7	11
Carried forward					281	0	8

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* Five weeks to the 1st July.

				£	s.	d.
Brought forward				281	0	8
For Observatories—*continued.*						
T. R. Robinson (Armagh)	33	15	0			
,, Expenses during quarter	7	3	11			
				40	18	11
W. P. Dymond (Falmouth)	66	5	0			
,, less Anemograph Forms	1	5	0			
				65	0	0
R. Grant (Glasgow)	62	10	0			
less Anemograph Forms	0	15	0			
				61	15	0
H. Williams (Holyhead)				2	13	6
B. Stewart (Kew)	62	10	0			
less Anemograph Forms	1	5	0			
	61	5	0			
,, Examination of records	100	0	0			
,, Sundries, per account	11	19	9			
,, Week's bill, repairing cases	0	16	0			
				174	0	9
C. Clouston (Orkney)				2	10	0
S. J. Perry (Stonyhurst)	50	0	0			
less Anemograph Forms	0	18	9			
	49	1	3			
,, Postages, &c. for quarter	0	11	3			
				49	12	6
T. Kerr (Valencia), salary for June	20	16	8			
,, Expenses during quarter	48	6	1			
				69	2	9
G. T. Watson (Yarmouth)				3	18	0
R. & J. Beck, Vapour Tension Instrument				76	8	6
J. Driscoll, rent at Valencia				25	0	0
T. Tiller, removing anemometers				2	10	0
S. Jeffery } Salaries and computations				*15	0	0
E. Magrath				*7	10	0
J. P. Cutts				*4	7	6
R. H. Curtis				9	3	4
F. Steventon				8	6	8
C. Stodart				*10	0	0
For Telegraphy (Quarterly Allowances, &c.):						
J. Costello (Dover)				3	5	6
J. Grant (Heart's Content)				3	5	0
W. D. Penny (Nairn) to 24th June				3	19	0
J. Merrifield (Plymouth)	3	5	0			
,, Dyer's bill, thermometer screen	0	10	0			
				3	15	0
J. Hoar (Portsmouth) to 24th June				3	6	0
Sir W. Mitchell (Scilly) ,,				5	2	6
J. Trotter (Thurso)				3	7	9
T. Robinson (Yarmouth)	3	5	0			
,, Expenses per account	0	8	9			
				3	13	9
Postmaster General, July to December 1870				670	13	9
Submarine Co., April				13	8	1
F. Gaster } Salaries and computations				†15	8	7
F. Brodie				*†6	11	10
G. G. Francis				*†5	4	8
Carried forward				1,649	19	6

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* Five weeks to the 1st July.

† Including extra attendance for telegraphy.

					£	s.	d.
Brought forward					1,649	19	6
For Ocean Meteorology:							
H. Toynbee, Marine Superintendent					33	6	8
J. J. Hicks, "A" thermometers		4	11	4			
,, Rain-gauge glasses		1	19	0			
,, Fishery barometers		22	10	0			
					29	0	4
R. Rivière, binding Pilot Charts					5	8	0
P. Feathers, Dundee agent					3	8	8
McGregor & Co., Glasgow agent					10	15	10
H. J. Smart, Liverpool agent					14	10	4
W. Salmon	Salaries and computations				20	0	0
R. Strachan					†18	6	8
C. Harding					10	16	8
J. A. Curtis					*7	10	0
W. G. James					*7	10	0
J. W. McVeagh					*3	10	0
For Office Expenses:							
J. S. Harding, junr., on account					100	0	0
Total					£1,914	2	8

Resolved—That if it should be convenient to Mr. Scott to extend his tour to Stockholm, Upsala, and Christiania, and to inspect the observatories in those cities, the Committee will be glad to place 25*l.* at his disposal towards defraying the expenses.

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* Five weeks to the 1st July.

† Including allowance for care of instruments.

The Committee then adjourned.

116, *Victoria Street, July* 3, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Admiral Richards.
Mr. Galton.	Col. Smythe.
Mr. Gassiot.	Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting, June 26, were read and confirmed.

In pursuance of the resolution of the 19th ult., the relations between Kew Observatory and the Meteorological Office were taken into consideration.

Mr. Scott submitted an extract from the council minutes of the Royal Society, dated the 15th of June, which he had received from Mr. White, Assistant Secretary, and which contained the announcement that the Royal Society had accepted the management of Kew Observatory under certain conditions.

The Chairman, as President of the Royal Society, reported that on the 29th of June the President and Council of that society had appointed the following gentlemen as a Committee to take charge of Kew Observatory:—

General Sir E. Sabine, K.C.B.,	Mr. De La Rue,
Mr. Francis Galton,	Mr. W. Spottiswoode,
Mr. Gassiot,	Colonel W. J. Smythe, R.A.,
The Hydrographer of the Admiralty,	Sir Charles Wheatstone;

and that from and after August 2nd next, the management of that observatory would be vested in the above-named Committee as the Kew Committee of the Royal Society.

Resolved—That the Kew Committee of the Royal Society be informed that the Meteorological Committee are prepared to allot to them the sum of 250*l*. per annum for the maintenance of Kew as one of their observatories, and also a further sum of 400*l*. per annum for work as their central observatory in the way of examination of the records and tabulations from all the observatories, as described in the report of the Committee for the year 1868, and for the ruling of fiducial lines on the barograms and thermograms.

Reported—That the Daily Weather Report had been supplied to H. Kains Jackson, Esq., for the "Mark Lane Express" and the "Harvest Journal."

The Committee then adjourned.

116, *Victoria Street, July* 24, 1871.

PRESENT:

Mr. De La Rue in the Chair.
Admiral Richards. | Sir C. Wheatstone.

The Director was in attendance.

The Minutes of last meeting (July 3) were read and confirmed.

Submitted—The following Report:—

July 13, 1871.

I visited the Telegraphic Reporting Station at Dover on the 12th inst., and found everything in good order. Mr. Costello is a careful observer, and the station is in all respects satisfactory, except as regards the exposure of the thermometers, which is unavoidably not as good as might be wished.

ROBERT H. SCOTT.

Reported—That Mr. S. Jeffery having been appointed Superintendent of Kew Observatory, had notified his intention to resign the situation which he held in the office at the end of the month.

Resolved—That Mr. T. E. Allen be appointed a temporary clerk in the office, at a salary of 1*l.* 10*s.* per week, duties to commence on the 31st inst.

Read—A Report by Mr. Beckley, giving the results of his inspection of the various Observatories, the instruments of which were found to be in good order.

Mr. Scott was instructed to ask Mr. Beckley as to the state of progress of the new form of the arrangement for recording the velocity of the wind. (Minutes, 1871, p. 10.)

Submitted—The Quarterly Weather Report for 1870, Part I.; also, the Annual Report for 1870.

Mr. Scott exhibited some Daily Weather Reports and charts which he had received from General Myer, Chief Signal Officer, Washington, and stated that he intended to submit to the Committee plans for the publication of similar charts in October.

Reported—That the Daily Weather Report had been supplied to Mr. W. Heath, Plymouth.

Read—A letter from Captain Toynbee, submitting excellent logs kept by—

Captain H. G. Wilcox, ship "St. Lawrence."
„ R. D. Lunham, ss. "Berar."
„ W. R. Barwood, barque "Fugitive."
„ Thos. Moore, ship "W. E. Gladstone."

And recommending them for presentation copies of the pilot charts.

He also submitted logs kept by the following gentlemen, who have already received the charts:—

Captain A. Fry, ship "Avonside." (Minutes, 1868, pp. 21, 37; 1869, p. 114.)
„ Thos. Donkin, ship "Inverness." (Minutes, 1870, p. 76.)
„ E. Carl V. Heggum, ship "Czar." (Minutes, 1870, p. 83; 1871, p. 17.)
„ John A. Martyn, ss. "Samaria" and "Java." (Minutes, 1869, pp. 21, 61; 1870, pp. 21, 76; 1871, p. 13.)

Resolved—That the pilot charts be presented to the four first-named gentlemen, and that Mr. Scott be instructed to write to the others, expressing to them the marked thanks of the Committee for their continued valuable services to the office.

Mr. Scott requested permission to transfer the following instruments from the Admiralty to the Board of Trade account, as they are not required for service in the navy:—

Maximum, Negretti, 5777, 5677, 5783.
Minimum (mercurial), Casella, 32, 295, 321, 328, 330.

Sanctioned.

Reported—That the imprest (Minutes, June 26) had been applied for and received on the 4th inst., when it was lodged to the credit of the Committee in the Bank of England.

Reported—That on the 17th inst. the following cheques had been drawn on the signature of Sir E. Sabine.

	£	*s.*	*d.*
B. Stewart, closing accounts with Kew	59	10	1
R. Beckley, inspection expenses	24	6	6

Submitted the following **Statement** respecting the **Records** for **June** 1871, received from the **Self-Recording Observatories**, and which have been examined at **Kew Observatory** (*see* Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	1 hr. of velocity & direction.		*28 each velocity and direction.		1 each D. & V.		None.		None.		†9 hrs. each V. & D.		2 hrs. direction.	
Orientation verified	—		—		14th.		—		30th.		27th.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	2·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·3	0·5	0·1	0·5	0·2	0·4	0·2	0·4	0·1	0·3	0·2	0·5	0·4	0·7
Residual difference (— Kew)	+0·2	+0·2	−0·1	0·0	−0·1	+0·1	−0·1	−0·1	0·0	−0·2	+0·1	−0·2	−0·1	−0·2
No. of errors discovered	5	0	2	0	0	1	1	2	0	0	1	0	3	4
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Fair.		Good.		Do.		Indifferent.		Do.		Fair.		Do.	
Records deficient	9 hrs.		None.		11 hrs.		‡2 hrs.		1 hr.		§2 hrs.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference	·0050		·0050		·0050		.0050		·0040		·0050		·0040	
Mean difference irrespective of sign	·0014		·0023		·0018		·0018		·0019		·0015		·0015	
Residual difference (— Kew)	+ ·0006		+ ·0017		·0007		+ ·0006		+ ·0008		− ·0001		+ ·0012	
Mean monthly difference between simultaneous barograph and barometer	·0036		·0030		·0023		·0026		·0020		·0012		·0025	
No. of errors discovered in entry of standard	0		0		0		1		1		0		1	
„ in calculating residual correction	0		0		0		2		0		0		3	
„ in applying residual correction	0		1		0		2		0		0		1	
„ in tabulation	0		0		0		1		0		0		0	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Do.		Do.		Fair.		Do.		Fair.		Do.	
Records deficient	3 hrs dry & wet.		2 wet, 1 dry.		1 dry, 6 wet.		22 wet.		1 dry, 22 wet.		None.		1 dry.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·20	0·30	0·20	0·30	0·20	0·20	0·30	0·20	0·20	0·10	0·20	0·20	0·20	0·20
Mean difference irrespective of sign	0·11	0·12	0·13	0·14	0·08	0·08	0·13	0·10	0·06	0·05	0·11	0·11	0·09	0·10
Residual difference (— Kew)	+0·02	0·00	+0·06	+0·06	+0·04	+0·08	−0·08	+0·05	−0·06	−0·03	+0·05	+0·05	−0·01	+0·05
Mean monthly difference between simultaneous thermograph and thermometer	0·22	0·19	0·17	0·16	0·09	0·09	0·09	0·12	0·09	0·14	0·15	0·17	0·19	0·23
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ discovered by subsidiary measurements	0	0	0	1	0	0	0	0	0	0	1	0	0	0
„ in maximum and minimum	0	0	0	0	0	1	1	0	0	0	0	0	2	1
„ in tabulation	1	0	0	‖0	3	0	3	2	1	0	¶2	0	0	0

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* One day's trace lost, pencils not being lowered.
† Nine hrs. do. do.
‡ Five and a half days curve tabulated to 0·01 inch at Kew.
§ Two days curve tabulated to 0·01 inch at Kew.
‖ One day dry and wet bulb curves re-tabulated.
¶ Two days wet bulb do. do.

The following cheques were drawn :—

		£	s.	d.
For Office:				
R. H. Scott	Salaries and wages	66	13	4
J. S. Harding, jun.		15	16	8
J. S. Harding, sen.		7	14	0
T. D. Bell		4	0	0
J. Wheldon, books		2	6	0
For Observatories:				
R. & J. Beck, zinc plates		4	18	0
A. Burgess, engravings of pantagraph		14	0	0
T. Kerr, Valencia, salary		20	16	8
S. Jeffery	Salaries and computations	12	0	0
E. Magrath		6	0	0
J. P. Cutts		3	10	0
R. H. Curtis		9	3	4
F. Steventon		8	6	8
C. Stodart		8	0	0
For Telegraphy:				
F. Gaster	Do.	†13	9	0
F. Brodie		*†5	12	0
G. G. Francis		*†4	14	0
For Ocean Meteorology:				
H. Toynbee, Marine Superintendent		33	6	8
W. Salmon	Salaries and computations	20	0	0
R. Strachan		‡18	6	8
C. Harding		†12	2	2
J. A. Curtis		6	0	0
W. G. James		6	0	0
J. W. McVeagh		2	16	0
For Office Expenses, &c.:				
J. S. Harding, jun., on account		125	0	0
R. H. Scott, special (Minutes, 26th June)		25	0	0
	Total	£455	11	2

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* Four weeks to 29th July.
† Including extra attendance.
‡ Including allowance for care of instruments.

The Committee then adjourned.

116, *Victoria Street, August* 14, 1871.

PRESENT:

Mr. De La Rue in the Chair.

Col. Smythe.

The Director was in attendance.

The Minutes of last meeting, July 24, were read and confirmed.

Submitted the following notice of a question to be asked in the House of Commons by Col. Sykes on this day.

" To ask the President of the Board of Trade whether the Meteorological Committee of the Board of Trade can or cannot furnish a return of the number of storm warnings sent to the seaports in 1870, and their results respecting the occurrence or non-recurrence (*sic*) of storms on or after the receipt of the warnings."

Mr. Scott was instructed to send the following reply :—

(Copy.)

SIR, Meteorological Office, August 14, 1871.

I AM instructed by the Meteorological Committee of the Royal Society to inform you, with reference to the question to be addressed to the President of the Board of Trade this evening by Colonel Sykes, that they will be most happy to furnish a return of all the messages containing telegraphic weather intelligence transmitted to the seaports and fishing stations, (upwards of 100 in number,) in connexion with the office during the year 1870, and also of all the storms experienced on the coasts of the British Islands during the same period, as far as the information at their disposal enables them to do so.

Inasmuch as the messages issued by the office are not in any way prophetic in their nature, but are simple statements of facts, they fear that they are not in a position to give any *further* return as to the occurrence or non-occurrence of storms on or after the receipt of the warnings.

I am, &c.
(Signed) ROBERT H. SCOTT,
Director.

Mr. Scott submitted the following report of his inspection of the northern observatories :—

August 14, 1871.

I BEG to report that I have completed my inspection of the northern stations.

Scarborough, visited July 29.—Everything was as usual in very good order.

North Shields, visited July 31.—Also in good order.

Ardrossan, „ August 1.— „ „

Leith, „ August 2.— „ „

Aberdeen, „ August 4.—The former observer, Mr. Gibson, has resigned, and Mr. M'Cormack, the clerk in charge of the telegraph station, has taken his place. The thermometers and rain gauge have been removed to Mr. M'Cormack's garden, where I propose to erect a Stevenson's screen, so that a good exposure of the thermometers will be secured.

Shetland Islands.—I reached Lerwick on the 5th, and on the 7th drove to Vatchly schoolhouse, Boddom, 22 miles south of Lerwick, and about 8 north of Sumburgh Head. The schoolhouse is on a slight rising ground well exposed all round, and close to the shore. The observer, Mr. Lawrence, the schoolmaster, was for many years at sea, where he rose to the rank of first officer of a ship of 600 tons, and at sea he constantly sent observations to Calcutta to Mr. Piddington.

I have therefore every reason to anticipate that his reports will be very useful to us, owing to his long experience in observing weather. The only apparent drawback to the efficacy of the station is that the cable between Lerwick and Wick does not work well.

Thurso, visited August 9th.—Everything in good order.

Wick. „ „ —This station was not in as good order as might have been wished. The observer has removed to another house, and at the time of my visit he had not erected the thermometer screen, although his change of residence had taken place two months ago. He is also rather careless about reading punctually. I have drawn his attention to these irregularities, and have reason to hope that an improvement will be effected.

Nairn.—Visited August 11.—This station was in very good order.

I also inspected the condition of the fishery barometers at Sandsair and Lerwick (Shetland), and at Staxigoe and Nairn. They are all properly attended to and kept clean, except that at Lerwick. I have addressed a letter to Mr. Gatherer, collector of customs at that place, on the subject.

I visited the observatory of *Glasgow* on the 2nd instant, and found everything in a satisfactory condition.

Aberdeen was visited on the 4th instant, and there too matters seemed to be going on regularly and well.

ROBERT H. SCOTT.

Mr. Scott reported the substance of a conversation which he had had with Professor Buys Ballot at Edinburgh, with reference to the proposed telegraphic reporting station at the Azores, and stated that as the cable could not be laid down for a year, he had informed Professor Buys Ballot that the Committee would be happy to take the matter into consideration as soon as the arrangements were in a more forward condition, and Professor Ballot was able to state how much money would be required.

Read a letter from Capt. Toynbee, submitting an " excellent log" kept by Capt. John Steele, S.S. " Erl King," and recommending him for a copy of the Pilot Charts.

Resolved—That Capt. Toynbee's recommendation be complied with.

Reported—That a copy of the Daily Weather Reports has been supplied to the editor of the " Mechanics' Magazine."

Also—That meteorological telegrams have been received from Bidston Observatory since the 1st August, and from Boddom, Shetlands, since the 2nd August.

Reported—That the vote for the Office had been passed by the House of Commons on the 28th ult., and that an order for 7,000*l.*, being the balance of the grant, had been received on the 5th instant.

Resolved—That 5,000*l.* be lodged to the deposit account of the Committee in the London and Westminster Bank, and 2,000*l.* to their current account in the Bank of England.

Submitted—The following statement of

Accounts paid, and Liabilities, to 30th June 1871.

——	Paid.			Estimated Liabilities.		
	£	*s.*	*d.*	£	*s.*	*d.*
Office :—						
Salaries	303	6	9	—		
Rent, fuel, &c.	122	6	11	5	5	4
Contingencies	57	2	3	4	9	2
Land Meteorology :—						
Expenses at observatories	624	5	3	50	12	8
New instruments for ditto	83	11	0	111	12	0
Computations	236	3	2	—		
Telegraphy	755	6	5	704	3	0
Inspections, &c.	31	5	9	—		
Computations	130	17	11	—		
Ocean Meteorology :—						
Marine Superintendent	100	0	0	—		
Instruments, Admiralty	8	12	10	58	12	0
Ditto Mercantile Marine	89	11	6	117	5	6
Computations and care of instruments	226	17	2	—		
Totals	2,769	6	11	1,051	19	8

Grand Total - - £3,821 6*s.* 7*d.*

Robert H. Scott, Director.

The following cheques were drawn :—

For office:

			£	*s.*	*d.*
R. H. Scott	Salaries and wages		66	13	4
J. S. Harding, jun.	,, ,,		15	16	8
J. S. Harding, sen.	,, ,,		*7	14	0
T. D. Bell	,, ,,		*4	0	0
G. Taylor, Gas Fittings, No. 113			4	12	1
Asher and Co., Books		2 9 0			
Do. do.		0 14 6			
			3	3	6
For observatories :					
Malby & Sons, Forms, &c.			24	5	0
T. Kerr, Valencia, Salary			20	16	8
Carried forward			147	1	3

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* Four weeks to the 26th August.

					£	s.	d.
	Brought forward				147	1	3
R. H. Curtis	Salaries and computations				9	3	4
F. C. Steventon	,, ,,				8	6	8
C. Stodart	,, ,,				8	0	0
T. E. Allen	,, ,,				6	0	0
E. Magrath	,, ,,				6	0	0
J. P. Cutts	,, ,,				3	10	0
For Telegraphy:							
Postmaster General,	Jan. to March				340	10	8
Scilly Islands Co.,	Jan. to 27 May				12	7	9
Submarine Co.,	May	13	13	9			
Do. do.	June	17	6	3			
					31	0	0
F. Gaster	Salaries and computations				†14	14	4
F. Brodie	,, ,,				*†4	14	6
G. G. Francis	,, ,,				*†4	11	8
For Ocean Meteorology:							
H. Toynbee, Marine Superintendent					33	6	8
Negretti and Zambra, repairing instruments					3	8	0
W. Salmon	Salaries and computations				20	0	0
R. Strachan	,, ,,				‡18	6	8
C. Harding	,, ,,				†12	19	2
J. A. Curtis	,, ,,				6	0	0
W. G. James	,, ,,				6	0	0
J. W. McVeagh	,, ,,				2	16	0
For Office Expenses:							
J. S. Harding, jun., on account					60	0	0
	Total				£758	16	8

The Committee then adjourned.

116, *Victoria Street, October* 30, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.
Mr. Galton.
Sir C. Wheatstone.
Colonel Smythe.
Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting (August 14) were read and confirmed.

Reported—That the reply to Colonel Sykes' question had been forwarded to the Board of Trade as directed at last meeting.

Reported—That the lodgments of 5,000*l.* and 2,000*l.* respectively had been made as directed at last meeting.

Submitted—The following Report.

I HAVE to report that in accordance with your resolution of the 26th of June, I have visited Christiania, Stockholm, Upsala, Copenhagen, and Hamburg.

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* Four weeks to the 26th August.
† Including allowance for extra attendance.
‡ Including allowance for care of instruments.

At Christiania I saw Professor Mohn, and as our relations with the establishment under his superintendence are already in a satisfactory condition, there is nothing regarding them which calls for special remark.

At Stockholm I went, in the first instance, to the telegraph office, and in the absence of the director, M. Preumayer, learned from the secretary that no organization for meteorological telegraphy exists in Sweden, excepting that reports from three stations, Haparanda, Hernosand, and Stockholm, are sent regularly to Paris.

Professor Edlund is at the head of the present meteorological system of Sweden, which is conducted under the auspices of the Royal Academy of Stockholm, and he publishes results of observations taken at 26 stations. He was absent from Stockholm when I called, so that I have failed to see him.

I then went to Upsala, where I was most kindly received by Professors Svanberg and Rubenson, the latter of whom has had the charge of the continuous meteorological observations which are furnished by Dr. Theorell's meteorograph, now in action at the observatory.

After conversation with Professor Rubenson, I resolved on my return to Stockholm to make through the Academy any proposals (which I might be authorised by you to bring forward) for a regular exchange of telegraphic information. I therefore called on Professor Gyldèn, the Director of the Astronomical Observatory of Stockholm, and with him went to the Academy, and spoke to Dr. Lindhagen, the secretary, who was very anxious to render as much assistance to the plan as lay in his power.

From Stockholm I proceeded to Copenhagen, where I called on Professor Steenstrup, secretary to the K. Danske Videnskabernes Selskab, and also on Docent Fjord, who has for several years discussed the observations made at the stations belonging to the Agricultural Society of Denmark. These gentlemen are very desirous of establishing a systematic telegraphic service, and M. Fjord undertook to send daily reports from the island of Fanö, in return for occasional intelligence of storms, such as is sent to Hamburg. This service was set in operation on the 1st of the present month.

I then called on M. Tietgen, chairman of the Great Northern Telegraph Company, to whom I had received an introduction from Sir C. Wheatstone. He most liberally offered to allow all meteorological messages to pass free over his lines if all land charges were borne by the respective Governments.

M. Tietgen introduced me to M. Fenger, the Minister of Finance, who is most favourably disposed to the plan of international telegraphy, and permitted me to make the formal application for an exchange of information to his department.

I also visited M. Faber, Director of the Telegraphs, and received every encouragement from him.

I returned by Hamburg, where I visited the Norddeutsche Seewarte, but in the absence of the Director, Herr von Freeden, I was unable to make any arrangements about the reports from Cuxhaven, which have been promised by Herr von Freeden for more than a year.

In conclusion, I would ask your permission to address applications to the Academy of Sciences at Stockholm, and to the Ministry of Finance at Copenhagen.

To the former I should apply for daily reports taken at 8 a.m., Greenwich time, from the four stations of Haparanda, Hernosand, Upsala, and Wisby, and to the latter for similar reports from two stations, Skagen and Fanö.

In return I should, with your permission, offer daily reports from six of our stations, if necessary, but I should hope that a less number would suffice.

The reports should be sent *viâ* Newcastle, by the direct Danish telegraph, as M. Tietgen prefers that route to the other *viâ* Peterhead and Egersund.

The cost of the addition to our system would be about 9*s.* per diem, or 160*l.* per annum, supposing that reports from the six stations were required.

As regards the form of the messages, I should propose that they should resemble those sent from our own stations, and described in the pamphlet entitled "Telegraphic Weather Intelligence."

Lastly, it only remains for me to express to you my sincere and grateful thanks for your liberality, in enabling me to visit the above-named stations, and my hopes that the results of my tour may be satisfactory to you.

Oct. 16, 1871.

Robert H. Scott.

Resolved—That Mr. Scott be authorised to make the applications proposed in his report to the Swedish Academy and to the Ministry of Finance at Copenhagen.

Submitted—The following Report.

I have to report that I have completed my inspection of the telegraphic stations and the observatories.

Liverpool.—The observatory at Bidston was visited September 29. Mr. Hartnup was absent, but his son was in charge. I have every reason to anticipate that the reports from this station, for the obtaining of which the Committee are indebted to the Mersey Dock and Harbour Board, will be most valuable additions to our daily information. The wind reports will be furnished from the indications of Osler's anemometer. The only defect in the station, which is an unavoidable one, is that the sea disturbance cannot be given in thick weather.

Holyhead.—Visited September 30th. Everything was in good order.

Moville.—Visited October 4th. At the beginning of the present year the Post Office authorities informed the office that the telegraph station at Greencastle had been discontinued, and the instruments were accordingly removed to this station. I found that they had all been erected in satisfactory positions, excepting the thermometers, but I have secured a better exposure for them. As regards wind, the local influences which affected the reports from Greencastle have about the same weight at Moville as at the former station. The sea disturbance is, however, less fully felt. The reports are carefully made up and the observations well taken, but the clerk did not keep his register properly. I have drawn his attention to this fact.

Valencia.—Visited October 7th. Everything was in good order.
Roches Point.— „ 11th. „ „
St. Ann's Head.— „ 13th. „ „
At the last-named station Mr. Galton's small anemograph has now been erected on the signal tower, where the other instruments are placed. Mr. Walker, the telegraph clerk, is a very careful and intelligent person, and I hope from him to have a conclusive report as to the suitability of the apparatus for a more extensive use.

At any of the above telegraphic stations where satisfactory observations of sea temperature could be made I have instructed the clerks to make such observations once a week, and with your approval I propose to have similar observations taken at all our stations round the coast.

I have also visited the observatories of Stonyhurst, Armagh, and Valencia, and found everything in good order in each instance. At Stonyhurst Mr. Perry had not yet been able to discover the reason of the discrepancy between his published maxima and minima and those of the thermograms, but the experiments are still in progress.

Oct. 17, 1871. ROBERT H. SCOTT.

The Report was approved, and Mr. Scott was instructed to have observations of sea temperature taken wherever practicable at the stations.

Mr. Scott reported that the increased amount of work in the office connected with the production of the Quarterly Weather Report had rendered it necessary to employ several of the clerks at extra hours, and he therefore asked permission to engage two additional temporary clerks, one to assist in the pantagraph room, the other in the telegraph room. —Approved.

Read—A letter from Dr. Robinson of Armagh, applying for an increase of salary for S. Call, the assistant at the observatory, in consideration of increased work connected with the rain gauge, &c.

Resolved—That an increase of salary of 10*l.* per annum, making the total annual salary 110*l.*, be granted from the 1st of the present month.

Reported—That as Mr. Jeffery had assumed the superintendence of Kew Observatory in the month of August, it would be necessary to notify the fact to the other observatories. Mr. Scott was accordingly instructed to do so.

Read—A letter from Capt. Toynbee, submitting a number of excellent registers, and recommending the following gentlemen for the Atlantic Pilot Charts—

Captain Archibald Campbell, ss. "Britannia" and "Europa."
„ D. Harris, ss. "Medway."
„ H. Manning, ss. "Kangaroo."
„ C. H. Renaut, ship "Celaeno."
„ W. H. Stuart, schooner "Richmond."
„ W. H. Townsend, barque "Valentine and Heléne."
„ J. B. Walker, ss. "Erik."

Resolved—That Pilot Charts be presented to the above-named gentlemen.

Captain Toynbee also submitted the following names for letters of thanks—

Captain F. B. Bouchette, ss. "European." (Minutes, 1871, p. 3.)
„ E. H. Capper, ship "Palm Tree." (Minutes, 1870, p. 33.)
„ Jas. Finlay, ship "Duncairn." (Minutes, 1870, p. 36.)
„ J. M'Donald Gray, barque "Speranza." (Minutes, 1871, p. 21.)
Mr. W. Greenwood, ship "Assaye." (Minutes, 1869, p. 90.)
Captain E. Carl V. Heggum, ship "Czar." (Minutes, 1870, p. 83; 1871, pp. 17, 40.)
„ T. Leportier, ss. "Diana." (Minutes, 1871, p. 3.)
„ T. C. Potts, ship "Tenasserim." (Minutes, 1870, pp. 6, 87.)
„ C. T. Raymond, ship "British Consul." (Minutes, 1869, p. 90; 1870, p. 86.)
„ W. Watson, ss. "Parthia." (Minutes, 1869, pp. 61, 113; 1870, p. 52; 1871, p. 17.)

Mr. Scott was instructed to convey to the above-named gentlemen the marked thanks of the Committee for their very valuable registers.

Submitted—The "Quarterly Weather Report for 1870, Part II.," and "Contributions to our Knowledge of the Meteorology of Cape Horn, &c."

Submitted the following Statement respecting the Records for July 1871, received from the Self-Recording Observatories, and which have been examined at Kew Observatory (*see* Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	None.		None.		1 hour direction.		24 hours V.; 7 D.		None.		None.		None.	
Orientation verified	—		—		July 10th.		—		July 31st.		July 21st.		July 1st.	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·3	0·3	0·2	0·6	0·1	0·4	0·1	0·6	0·2	0·3	0·2	0·4	0·4	0·6
Residual difference (— Kew)	+0·1	0·0	+0·1	0·0	0·0	+0·3	0·0	+0·1	−0·1	−0·2	+0·1	0·0	−0·1	+0·1
No. of errors discovered	None.	None.	1	0	0	0	1	0	0	0	0	0	1	4
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Fair.		Good.		Fair.		Good.	
Records deficient	None.		3 hours.		None.		12 hours.		None.		None.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference	·0050		·0050		·0050		·0050		·0050		·0050		·0050	
Mean difference irrespective of sign	·0022		·0024		·0017		·0022		·0019		·0017		·0020	
Residual difference (— Kew)	+·0004		+·0020		−·0001		+·0003		+·0001		+·0001		+·0012	
Mean monthly difference between simultaneous barograph and barometer	·0018		·0027		·0020		·0027		·0020		·0014		·0024	
No. of errors discovered in entry of standard	0		0		0		1		1		0		0	
„ in calculating residual correction	0		2		1		1		0		0		3	
„ in applying residual correction	0		0		0		0		2		1		14	
„ in tabulation	0		0		0		0		0		0		2	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Fair.		Good.		Fair.		Good.		Fair.		Good.	
Records deficient	None.		1 dry; 3 wet.		11 dry; 9 wet.		17 hours wet.		3 hours wet.		2 hours dry.		None.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·40	0·30	0·20	0·20	0·20	0·20	0·20	0·30	0·10	0·10	0·30	0·30	0·20	0·30
Mean difference irrespective of sign	0·17	0·19	0·10	0·09	0·08	0·09	0·11	0·12	0·05	0·06	0·09	0·10	0·09	0·11
Residual difference (— Kew)	+0·10	+0·02	+0·06	+0·06	+0·02	+0·05	−0·04	−0·04	−0·03	−0·02	−0·05	−0·04	−0·03	+0·01
Mean monthly difference between simultaneous thermograph and thermometer	0·23	0·20	0·14	0·14	0·08	0·08	0·11	0·13	0·11	0·12	0·14	0·15	0·20	0·29
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ discovered by subsidiary measurements	2	0	0	0	0	0	1	6	0	0	0	2	0	0
„ in maximum and minimum	1	1	0	1	0	0	0	0	1	1	1	2	4	5
„ in tabulation	1	1	0	*	0	0	0	0	0	0	0	0	1	3

* **Two days wet bulb retabulated at Kew.**

Submitted the following **Statement** respecting the **Records** for **August** 1871, received from the **Self-recording Observatories**, and which have been examined at **Kew Observatory** (*see* Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action - - - - - -	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient - - - -	None.		None.		None.		2 hours V; 1 hour D.		12 hours V; 11 hours D.		None.*		None.	
Orientation verified - - - -	—		—		August 30th.		—		August 31st.		August 26th.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference - - -	1·0	1·0	1·0	2·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	2·0	1·0	2·0
Mean difference irrespective of sign - -	0·15	0·50	0·37	0·61	0·18	0·37	0·15	0·52	0·15	0·32	0·12	0·57	0·22	0·32
Residual difference (— Kew) - - -	−0·08	+0·08	−0·08	+0·08	−0·20	+0·12	−0·07	−0·02	−0·07	−0·07	+0·12	+0·20	+0·10	−0·08
No. of errors discovered - - -	0	2	0	0	0	0	1	0	0	0	0	0	0	1
BAROGRAPH :—														
Action - - - - - -	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography - - - - -	Fair.		Fair.		Good.		Fair.		Good.		Good.		Good.	
Records deficient - - - -	22 hours.		47 hours.		7 hours.		None.		None.		None.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference - - - -	·0050		·0050		·0040		·0050		·0050		·0050		·0050	
Mean difference irrespective of sign - -	·0017		·0015		·0016		·0020		·0015		·0015		·0017	
Residual difference (— Kew) - - -	+·0010		+·0009		+·0002		+·0002		+·0009		−·0001		−·0006	
Mean monthly difference between simultaneous barograph and barometer - - -	·0018		·0032		·0018		·0023		·0025		·0013		·0025	
No. of errors discovered in entry of standard -	0		1		1		1		0		0		0	
„ in calculating residual correction - -	0		0		0		1		0		0		0	
„ in applying residual correction - -	3		2		0		5		0		1		1	
„ in tabulation - - - -	1		0		0		0		0		0		0	
THERMOGRAPH :—														
Action - - - - - -	Good.		Fair.		Good.		Good.		Good.		Good.		Good.	
Photography - - - - -	Good.		Fair.		Good.		Fair.		Good.		Good.		Fair.	
Records deficient - - - -	2 hours dry bulb.		38 hours wet bulb; 1 hour dry.		23 hours wet bulb; 1 hour dry.		None.		2 hours wet.		1 hour wet.		14 hours dry; 15 hours wet.	
Result of 40 *Remeasurements* :	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference - - -	0·30	0·30	0·20	0·30	0·20	0·20	0·30	0·30	0·10	0·10	0·20	0·30	0·20	0·20
Mean difference irrespective of sign - -	0·11	0·14	0·10	0·12	0·08	0·10	0·13	0·17	0·06	0·06	0·12	0·12	0·09	0·11
Residual difference (— Kew) - - -	0·00	−0·07	+0·05	+0·05	+0·04	+0·05	−0·13	−0·09	+0·02	−0·03	+0·08	+0·09	−0·04	−0·06
Mean monthly difference between simultaneous thermograph and thermometer - -	0·21	0·18	0·14	0·14	0·07	0·09	0·10	0·16	0·12	0·14	0·16	0·16	0·23	0·23
No. of errors discovered in entry of standard -	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ discovered by subsidiary measurements -	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ in maximum and minimum - - -	2	1	0	0	0	0	0	0	0	0	0	0	0	0
„ in tabulation - - - -	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Submitted—The following Statement respecting the Records for September 1871 received from the Self-recording Observatories, and which have been examined at Kew Observatory (*see* Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.*		Good.		Good.		Good.		Good.	
Records deficient	3 hours Velocity ; 3 hours Direction.		None.		8 hours V. ; 7 D.		None.		None.		1 hour Velocity.		None.	
Orientation verified	—		—		September 20th.		—		—		September 25th.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·2	0·55	0·2	0·4	0·2	0·3	0·2	0·6	0·1	0·4	0·3	0·5	0·1	0·5
Residual difference (—Kew)	0·0	+0·1	0·0	+0·1	—0·2	0·0	—0·1	+0·3	+0·1	+0·1	—0·1	0·0	0·0	+0·2
No. of errors discovered	0	1	1	0	0	0	0	0	0	0	0	0	0	5
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Good.		Good.		Good.		Many sheets discoloured.		Good.		Good.		Good.	
Records deficient	None.		37 hours.†		None.		None.		None.		None.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference	·0050		·0050		·0050		·0040		·0050		·0050		·0050	
Mean difference irrespective of sign	·0017		·0027		·0016		·0015		·0020		·0022		·0019	
Residual difference (—Kew)	+·0004		+·0016		—·0004		—·0001		+·0013		—·0004		+·0009	
Mean monthly difference between simultaneous barograph and barometer	·0017		·0027		·0019		·0022		·0018		·0014		·0026	
No. of errors discovered in entry of standard	2		0		0		0		1		0		0	
„ in calculating residual correction	2		1		0		1		0		0		0	
„ in applying residual correction	2		0		0		1		0		0		16	
„ in tabulation	1		0		0		0		1		0		0	
THERMOGRAPH :—														
Action	Generally good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Generally good.		Good.		Good.		Fair.		Good.		Good.		Good.	
Records deficient	None.		1 hr. wet bulb.		§43 hrs. wet bulb ; 1 hr. dry bulb.		11 hrs. dry bulb ; 17 hrs. wet bulb.		None.		1 hr. wet bulb.		None.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·20	0·30	0·20	0·30	0·20	0·20	0·30	0·30	0·10	0·20	0·30	0·30	0·20	0·30
Mean difference irrespective of sign	0·12	0·15	0·11	0·12	0·09	0·10	0·15	0·15	0·05	0·03	0·11	0·13	0·11	0·13
Residual difference (—Kew)	+0·06	+0·01	—0·06	—0·07	+0·05	+0·07	—0·15	—0·15	—0·03	0·00	—0·04	0·00	—0·06	—0·08
Mean monthly difference between simultaneous thermograph and thermometer	0·17	0·18	0·15	0·13	0·08	0·10	0·09	0·10	0·10	0·13	0·15	0·16	0·19	0·20
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	‡27	0	0	0	0	2	0
„ discovered by subsidiary measurements	2	0	0	0	0	0	0	0	0	0	1	1	0	0
„ in maximum and minimum	0	0	0	0	0	0	0	0	0	0	0	0	5	5
„ in tabulation	0	1	0	0	0	0	0	0	0	0	2	1	0	0

* Contact of pencils neglected.

† Stoppage of clock.

‡ Standard uncorrected.

§ Wet bulb either out of action or no trace.

Reported—That the Daily Weather Report had been supplied to—

J. Baxendell, Esq., F.R.A.S., for Meteorological Observatory, Southport.
J. Ellis, Scarborough, for Exhibition.
W. S. Hawker, Esq., J.P., Boscastle, „ „

Mr. Scott reported that he had taken the liberty of offering the use of the marine room to the Meteorological Society, for their evening meeting on the 15th November, as the society had been obliged to leave the rooms of the Institute of Civil Engineers.—Approved.

Reported—That the maximum themometer recently supplied to Stonyhurst had been broken. Mr. Scott was instructed to replace it and charge the cost to that Observatory.

Submitted—A suggestion from Mr. Jeffery that stencil plates should be supplied to the Observatories for the barograms and thermograms.—Approved.

Read—A letter from the Secretary of the Anglo-American Telegraph Company, stating that from the 1st of January 1872, the messages received from Heart's Content would be charged for by the Company at the rate of 1*l.* for 10 words, being half the regular tariff of the Company.

Mr. Scott was instructed to reply that as the Committee had already (Minutes, 1868, pp. 28, 33) notified that they could not undertake to pay for these reports, they requested Mr. Weaver to give instructions to have them discontinued from the 1st of November.

Submitted—A letter from the Colonial Office to the Board of Trade, relative to a proposal for establishing a system of weather telegraphy in Barbadoes and the adjacent islands, on which the Board of Trade requested the opinion of the Committee.

Mr. Scott was instructed to prepare a reply and submit it to the Committee at next meeting.

Mr. Scott reported that at Stockholm he had seen Professor A. E. Nordenskjold, who had notified to him his intention of going to Spitzbergen in the course of the year 1872, and had asked him whether meteorological and magnetical observations from that island would be of value to the Meteorological Office.

Mr. Scott was instructed to reply that the Committee viewed with extreme satisfaction the prospect of obtaining observations from so important a station, and that they wished every success to the project.

ACCOUNTS PAID and LIABILITIES to 30th September 1871.

——	Paid.			Estimated Liabilities.		
	£	*s.*	*d.*	£	*s.*	*d.*
OFFICE :—						
Salaries	612	17	2		—	
Rent, fuel, &c.	274	3	3	12	11	0
Contingencies	117	8	7	4	0	0
LAND METEOROLOGY :—						
Expenses at observatories	1,279	8	2	51	7	0
New instruments for ditto	88	16	0	111	2	0
Computations	415	19	5		—	
Telegraphy	1,529	7	1	310	8	10
Inspections, &c.	102	17	7		—	
Computations	227	19	9		—	
OCEAN METEOROLOGY :—						
Marine Superintendent	200	0	0		—	
Instruments, Admiralty	31	16	2	65	12	0
Ditto, Mercantile Marine	171	12	1	125	4	11
Computations and care of instruments	445	13	5		—	
Totals	£5,497	18	8	680	5	9

Grand total, 6,178*l.* 4*s.* 5*d.*

ROBERT H. SCOTT,
Director.

Reported that the following cheques for September had been drawn on the 26th September, on the signature of Admiral Richards:—

					£	s.	d.
For Office:							
R. H. Scott	Salaries and wages				66	13	4
J. S. Harding, jun.					15	16	8
J. S. Harding, sen.					*9	12	6
T. D. Bell					*†5	7	11
C. W. Jacques, rent for quarter					133	13	0
Priest Brothers, matting, &c.					11	18	0
For Observatories (quarterly allowances, &c.):							
D. Thomson (Aberdeen)		62	10	0			
less anemograph forms		0	12	6			
					61	17	6
T. R. Robinson (Armagh)		33	15	0			
Expenses during quarter		8	4	6			
					41	19	6
W. P. Dymond (Falmouth)		66	5	0			
less anemograph forms		0	12	6			
					65	12	6
R. Grant (Glasgow)		62	10	0			
less anemograph forms		0	3	9			
		62	6	3			
Leslie's bill, erecting rain gauge		1	6	9			
Annan's bill, photographs		1	8	6			
Postages, 1868–70		3	15	0			
					68	16	6
H. Williams (Holyhead)					2	13	6
S. Jeffery (Kew) two months		41	13	4			
less anemograph forms		0	12	6			
		41	0	10			
Examination of records, two months		66	13	4			
					107	14	2
C. Clouston (Orkney)					3	3	8
S. J. Perry (Stonyhurst)		50	0	0			
less anemograph forms		0	12	6			
					49	7	6
T. Kerr (Valencia), salary		20	16	8			
Expenses during quarter		51	12	1			
					72	8	9
G. T. Watson (Yarmouth)					4	9	8
J. J. Hicks, rain gauge glasses		1	10	0			
,, repairing barograph		3	15	0			
					5	5	0
R. H. Curtis	Salaries and computations				9	3	4
F. C. Steventon					8	6	8
C. Stodart					*10	0	0
T. E. Allen					*7	10	0
E. Magrath					*7	10	0
J. P. Cutts					*4	7	6
For Telegraphy (quarterly allowances, &c.):							
J. Costello (Dover)					3	5	8
J. Grant (Heart's Content)					3	5	0
J. Hartnup (Liverpool), nine weeks					2	5	0
W. D. Penny (Nairn)					4	11	0
J. Merrifield (Plymouth)					3	5	0
Carried forward					789	18	10

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* Five weeks to the 30th.

† Including allowance for extra attendance.

					£	s.	d.
Brought forward					789	18	10
J. Hoar (Portsmouth)					3	10	10
Sir W. Mitchell (Scilly) „					4	12	8
W. Lawrence (Shetlands) nine weeks					2	5	0
J. Trotter (Thurso)					3	9	0
T. Robinson (Yarmouth)					3	5	0
C. B. Fyle, post office telegrams					307	12	10
N. J. Holmes, Scilly „					7	6	3
S. M. Clare, Submarine Company, July		18	14	11			
Ditto ditto August		22	14	1			
					41	9	0
A. Adie, Stevenson's thermometer screen					1	17	6
F. Gaster	Salaries and computations				†16	4	5
F. Brodie					*†6	0	6
G. G. Francis					*†6	12	8
For Ocean Meteorology:							
H. Toynbee, Marine Superintendent					33	6	8
J. J. Hicks, " A " instruments					5	3	6
L. P. Casella, " A " thermometers		16	0	6			
„ " M.O." „		16	19	0			
„ " S.R. " „		1	2	6			
„ " D.S." „		9	3	0			
					43	5	0
J. N. Jones, Aberdeen agent					4	5	3
McGregor & Co., Glasgow agent					5	13	6
H. J. Smart, Liverpool agent					19	15	9
Williams & Norgate, Pilot Charts					10	0	0
W. Salmon	Salaries and computations				20	0	0
R. Strachan					‡18	6	8
C. Harding					†12	14	11
J. A. Curtis					*7	10	0
W. G. James					*7	10	0
J. W. McVeagh					*3	10	0
For Office Expenses :							
J. S. Harding, jun., on account					120	0	0
Total					£1,505	5	9

The following cheques for October were drawn :—

For Office:				
R. H. Scott	Salaries and wages	66	13	4
J. S. Harding, jun.		15	16	8
J. S. Harding, sen.		§7	14	0
T. D. Bell		§†4	1	9
Davey, Thompson, & Co., coals		9	4	0
C. W. Jacques, agreement, &c.		3	7	0
E. Higgs, repairs, &c.		4	0	0
For Observatories:				
T. Kerr, salary for October		20	16	8
E. Stanford, advertisements		5	3	0
P. Adie, scales, &c.		8	7	4
R. H. Curtis	Salaries and computations	9	3	4
F. C. Steventon		8	6	8
C. Stodart		§8	0	0
T. E. Allen		§6	0	0
E. Magrath		§6	0	0
J. P. Cutts		§3	10	0
Carried forward		186	3	9

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* Five weeks to the 30th.

† Including allowance for extra attendance.

‡ „ „ care of instruments.

§ Four weeks to the 28th.

				£	s.	d.
Brought forward				186	3	9
For Telegraphy:						
S. M. Clare, Submarine Co., September				23	4	9
N. J. Holmes, Scilly Co., August	4	1	3			
„ „ September	3	6	3	7	7	6
F. Gaster — Salaries and computations				†16	13	11
F. Brodie — Salaries and computations				*†5	5	7
G. G. Francis — Salaries and computations				*†4	14	0
For Ocean Meteorology:						
H. Toynbee, Marine Superintendent				33	6	8
L. P. Casella, instruments				6	7	6
P. A. Feathers, Dundee agent				4	15	0
J. J. Hicks, thermometers				15	0	4
N. Rivière, binding Pilot Charts				8	2	0
P. Adie, repairing barometer apparatus				14	0	2
W. Salmon — Salaries and computations				20	0	0
R. Strachan — Salaries and computations				‡18	6	8
C. Harding — Salaries and computations				†12	9	3
J. A. Curtis — Salaries and computations				*6	0	0
W. G. James — Salaries and computations				*6	0	0
J. W. McVeagh — Salaries and computations				*2	16	0
For Office Expenses:						
J. S. Harding, jun., on account				50	0	0
Total				£440	13	1

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* Four weeks to the 28th.
† Including allowance for extra attendance.
‡ „ „ care of instruments.

The Committee then adjourned.

116, *Victoria Street, November* 6, 1871.

PRESENT:
Mr. De La Rue in the Chair.
Mr. Galton.

The Director was in attendance.

The Minutes of last meeting (October 30) were read and confirmed.

Reported—That the letters had been written to Stockholm and Copenhagen as directed at last meeting.

Also that the reports from Heart's Content had been stopped on the 1st instant.

Resolved—That the following reply be sent to the Board of Trade respecting the proposal to establish a telegraphic reporting service in Barbadoes:—

I am instructed by the Committee to inform you that they have read with great interest Governor Rawson's proposals for the establishment of a telegraphic weather reporting service for Barbadoes and the adjacent islands.

The character of the West India hurricanes is such, that, if symptoms of the approach of one of these storms be detected at one of the islands lying to the eastward, and this fact be telegraphed to the

adjacent islands, there will be in general ample time for vessels in port there to prepare for the gale before it breaks upon them.

In support of this statement they may say that the usual course followed by these storms is well known, and their rate of advance seldom if ever exceeds 20 English miles an hour, whereas in this country storms sometimes travel at a speed of more than 40 miles an hour.

The Committee would, therefore, earnestly confirm Governor Rawson's propositions, and most respectfully urge on Her Majesty's Government the advisability of instituting an organization of the nature proposed, if expedient on other grounds.

I am to forward for Lord Kimberley's information (as requested) copies of the various publications and forms bearing on this subject which have been issued by the Meteorological Office, and I shall be happy to afford any information of a financial nature which his Lordship may wish to have before him.

Submitted—An application from Mr. C. Meldrum for extracts from registers from the Indian Ocean for the month of March 1861 to be made at his expense, on the terms laid down by the Committee.—Granted.

Submitted—An application from Professor Mohn for any observations taken on the 24th, 25th, 26th, and 27th of August.—Granted.

Read—A letter from the Astronomer Royal enclosing a copy of a letter from D. M. Henderson, Esq., Chief Coast Lights Engineer in China, in which he asks for instructions as to the organization of meteorological observations.—Mr. Scott was instructed to communicate with Mr. Henderson.

Submitted—A report from Mr. Jeffery on the modifications which had been effected in the recording portion of the anemograph, according to Mr. De La Rue's suggestion (Minutes, 1870, p. 89; 1871, p. 10), with a bill from Munro for 48*l.*, for altering the instrument, and an estimate for altering the other anemographs to correspond with it, for the sum of 38*l.* 15*s.* apiece.

Resolved—That Mr. Jeffery be requested to work the new anemograph for the period of three months, and then to furnish a report on it.

Submitted—A specimen of a proposed daily weather chart.—Mr. Scott was instructed to confer with Mr. Spottiswoode on the subject of the cost, and to report to the Committee.

Submitted—A scheme for improvements in the Telegraphic Reporting Code.—Approved.

Read—A letter from Mr. Scudamore, stating that he was now prepared to carry out the plan for daily reports from inland stations, proposed in the Committee's resolution of May 23, 1870.—Mr. Scott was instructed to confer with him on the subject.

Read—A letter from Captain Toynbee, submitting an excellent log kept by Captain G. H. Jones, S.S. "Nile," and recommending him for a presentation copy of the Pilot Charts.

Resolved—That this recommendation be complied with.

Mr. W. C. Truscott was appointed a temporary clerk, at a salary of 17*s.* 6*d.* per week.

Mr. Scott stated that Sir C. Wheatstone had informed him that he purposed attending the Telegraphic Conference at Rome, and that he wished to know if he could in any way serve the interests of the Office in the matter of weather telegraphy.

Resolved—That Sir C. Wheatstone be requested to inform the telegraphic authorities at Rome of the procedure of this Office.

The Committee then adjourned.

116, *Victoria Street, November* 20, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Admiral Richards.
Mr. Galton.	Mr. Spottiswoode.

The Director was in attendance.

The Minutes of last meeting (November 6) were read and confirmed.

Read—The following letter:

MY DEAR SIR, Royal Society, November 14, 1871.

I HEREWITH transmit to you copy of a communication made to the Royal Society by Admiral Ryder, containing a proposal to found medals for the encouragement of meteorological observations and marine surveying. The President and officers believe that it would be advantageous, before bringing the matter before the Council of the Royal Society, to submit Admiral Ryder's memorandum *un*officially to the Meteorological Committee, and request their opinion thereupon. I have, therefore, to request the favour of you to hand to the Committee the document in question, and to state to them the wishes of the President and officers in regard to it.

(Signed) W. SHARPEY.

R. H. Scott, Esq.

Mr. Scott was instructed to transmit to Dr. Sharpey a copy of the following resolution:

Resolved—That while the Committee have been in the habit of recognizing merit among captains in the mercantile marine by small presents of charts, they would notice to the Royal Society that the proposal of Admiral Ryder concerns the Royal Navy, and refers exclusively to junior officers, and to encouraging their education, rather than to any advancement in scientific research. Under these circumstances they do not feel that their experience furnishes any data for making any recommendation as to the reply of the Royal Society.

Read—A letter from Dr. Lindhagen, secretary of the Royal Academy of Science at Stockholm, acknowledging the receipt of the Committee's proposal for an interchange of telegrams, and stating that he hoped to send a reply by the end of the year.

Reported—That by the kindness of Mr. Spottiswoode the Office had ascertained that the Stationery Office would sanction the lithography of a Daily Weather Chart.—Mr. Scott was instructed to proceed with the preparation of such a chart.

Submitted—An estimate from Messrs. Malby and Son stating that the cost of lithographing the 14 charts of the Atlantic, for the beginning of February 1870, which had been prepared by Captain Toynbee, would be 50*l*.

Resolved—That these charts be lithographed, with an index chart showing the changes of weather during the entire period.

Read—A letter from Captain Toynbee submitting an excellent log, by Captain John Maddison, ship "Anglesey," and recommending him for a presentation copy of the Pilot Charts.—Approved.

Submitted—An estimate for a stove for the Pantagraph room at a cost of 6*l*.

Resolved—That this estimate be accepted, provided the insurance office does not object.

Reported—That Mr. Robert Sargeant had been appointed a temporary clerk at a salary of 14*s*. per week.—Approved.

Mr. Scott stated that as it appeared that the anemometer at Bermuda was out of order, it was advisable to recall it, and he was authorized to do so.

Submitted—A specimen of the return to the House of Commons, (Mr. Fortescue's motion,) of the storm signals and storms of 1870 (Minutes, p. 43).

Submitted—An application from Dr. Hildebrandsson, of Upsala, for copies of certain of the Daily Weather Reports. Mr. Scott was authorized to furnish them.

SUBMITTED the following STATEMENT respecting the RECORDS for OCTOBER 1871, received from the SELF-RECORDING OBSERVATORIES, and which have been examined at KEW OBSERVATORY (*see* Minutes, 21st December 1868).

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Records deficient	None.		*24 hrs. V. & D.		†33 hrs. V. & D.		None.		None.		None.		None.	
Orientation verified	—		—		27th.		—		27th.		31st.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·2	0·6	0·1	0·5	0·2	0·3	0·2	0·5	0·1	0·3	0·1	0·3	0·1	0·6
Residual difference (— Kew)	0·0	+0·2	—0·1	+0·1	—0·2	+0·1	—0·1	+0·3	—0·1	—0·1	0·0	+0·1	+0·1	+0·4
No. of errors discovered	0	0	0	0	0	0	0	4	0	0	1	0	1	16
													In 13 instances the rain measure has been corrected at Kew.	
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Do.		Do.		Do.		Do.		Do.		Do.	
Records deficient	None.		6 hrs. lost.		None.		None.		None.		None.		4 hrs. lost.	
Result of 40 *Remeasurements* :—														
Greatest difference	·0050		·0050		·0040		·0050		·0050		·0050		·0050	
Mean difference irrespective of sign	·0018		·0023		·0015		·0017		·0017		·0021		·0022	
Residual difference (— Kew)	+·0005		+·0011		+·0003		—·0003		+·0003		+·0006		+·0003	
Mean monthly difference between simultaneous barograph and barometer	·0017		·0024		·0019		·0026		·0020		·0011		·0024	
No. of errors discovered in entry of standard	0		0		0		0		0		0		1	
„ in calculating residual correction	0		0		0		2		0		0		1	
„ in applying residual correction	0		1		0		5		0		1		4	
„ in tabulation	0		0		0		0		0		0		0	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Do.		Do.		Do.		Do.		Do.		Do.	
Records deficient	None.		None.		73 hrs.‡		4 hrs. wet bulb.‡ 18 hrs. D. & W.§		None.		9 hrs. W. & 1 D.		1 hr. D. & W.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·20	0·30	0·20	0·30	0·20	0·20	0·30	0·30	0·20	0·20	0·20	0·20	0·30	0·30
Mean difference irrespective of sign	0·12	0·14	0·10	0·13	0·08	0·10	0·12	0·12	0·06	0·07	0·11	0·12	0·13	0·15
Residual difference (— Kew)	0·00	+0·01	—0·04	—0·06	—0·03	—0·05	+0·02	+0·01	+0·01	—0·01	+0·11	+0·05	+0·08	+0·06
Mean monthly difference between simultaneous thermograph and thermometer	0·14	0·13	0·13	0·15	0·08	0·09	0·11	0·10	0·12	0·13	0·13	0·13	0·24	0·27
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	0	0	2	2
„ discovered by subsidiary measurements	0	5	0	0	0	0	2	1	0	0	0	0	8	0
„ in maximum and minimum	0	0	0	0	0	0	0	0	0	0	0	0	10	4
„ in tabulation	0	1	0	0	0	0	0	0	0	0	0	0	2	0

* Neglect in bringing pencil in contact.
† Through stoppage of clock.
‡ Wet bulb out of action.
§ Owing to the clock line breaking and the stoppage of clock.

The Committee then adjourned.

116, *Victoria Street, November* 27, 1871.

PRESENT:

Mr. Spottiswoode in the Chair.

Mr. De La Rue. | Sir C. Wheatstone.

Mr. Gassiot.

The Director was in attendance.

The Minutes of last meeting (November 20) were read and confirmed.

Reported—That the letter had been forwarded to Dr. Sharpey as directed at last meeting.

Read—A certificate stating that Edwin Magrath, one of the temporary clerks, was suffering from disease of the knee joint, and would be unable to attend the office for three months.

Leave of absence for three months was granted.

Read—A letter from Capt. Toynbee, submitting excellent logs kept by Capt. J. Grange, S.S. " Acantha," Capt. F. Wherland, Ship " Galatea " (Minutes, 1869, p. 90, 1871, p. 6), Mr. Paterson, Chief Officer, S.S. " Moravian " (Minutes, 1869, p. 113, 1870, p. 76), and recommending Capt. Grange for the Pilot Charts, Capt. Wherland and Mr. Paterson for special thanks.—Approved.

A letter was written to the London and Westminster Bank requesting them to transfer 1,000*l*. from the deposit account of the Committee to their current account in the Bank of England.

The following cheques for November were drawn:—

		£	*s.*	*d.*
For Office:				
R. H. Scott	Salaries and wages	66	13	4
J. S. Harding, jun.		15	16	8
J. S. Harding, sen.		*7	14	0
T. D. Bell		*†4	1	9
C. Dunning, Fittings		3	13	8
For Observatories:				
Bates, Elliot, & Co., Photographic Trays		3	6	3
T. Culleton, Stencil Plates		8	13	4
S. Jeffery, Kew, Postages, &c.		19	5	9
T. Kerr, Valencia, Salary		20	16	8
R. W. Munro, altering Anemograph		48	0	0
R. H. Curtis	Salaries and computations	9	3	4
F. C. Steventon		8	6	8
C. Stodart		*8	0	0
T. E. Allen		*6	0	0
E. Magrath		*6	0	0
J. P. Cutts		*3	10	0
For Telegraphy:				
The Postmaster General, September Quarter		270	19	3
N. J. Holmes, Scilly Islands Company, October		3	5	0
S. M. Clare, Submarine Company, October		21	11	1
W. S. Hawker, Signal Staff; Bascastle		3	0	0
F. Gaster	Salaries and computations	†14	3	3
F. Brodie		*†5	5	10
G. G. Francis		*†4	19	3
	Carried forward	562	5	1

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* Four weeks to the 25th.

† Including allowance for extra attendance.

				£	s.	d.
Brought forward				562	5	1
For Ocean Meteorology:						
H. Toynbee, Marine Superintendent				33	6	8
Elliott Brothers, "A" Instruments	10	6	6			
Do. "M.O." ,,	0	13	0	10	19	6
P. Adie, repairing Barometers				43	12	0
J. J. Hicks, Hydrometers				2	5	0
W. Salmon — Salaries and computations				20	0	0
R. Strachan — Salaries and computations				‡18	6	8
C. Harding — Salaries and computations				†12	3	7
J. A. Curtis — Salaries and computations				*6	0	0
W. G. James — Salaries and computations				*6	0	0
J. W. McVeagh — Salaries and computations				*2	16	0
For Office Expenses:						
J. S. Harding, jun., on account				90	0	0
Total				£807	14	6

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* Four weeks to the 25th.
† Including allowance for extra attendance.
‡ Including allowance for care of instruments.

The Committee then adjourned.

116, *Victoria Street, December* 4, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.
Mr. Galton.
Mr. Gassiot.
Sir C. Wheatstone.

The Director was in attendance.

The Minutes of last meeting (November 27) were read and confirmed.

Mr. Scott was instructed to inform the Board of Trade that the amount required by the Committee for the year 1872-3 would be 10,000*l.*, being the same sum as that voted in the present year.

Resolved—That the following detailed estimate be printed on the Minutes :—

ESTIMATE FOR YEAR 1872-73.

	£	s.	d.	£	s.	d.
Office:						
Salaries	1,170	0	0			
Rent and fuel	600	0	0			
Office expenses	300	0	0	2,070	0	0
Land Meteorology:						
Expenses of observatories	2,590	0	0			
Computations	700	0	0	3,290	0	0
Telegraphy	2,100	0	0			
Inspections, &c.	120	0	0			
Computations	450	0	0	2,670	0	0
Carried forward				8,030	0	0

	£	s.	d.	£	s.	d.
Brought forward - - - -				8,030	0	0
Ocean Meteorology:						
Marine Superintendent - - - -	400	0	0			
Instruments, Admiralty - - -	150	0	0			
Do. Mercantile Marine - -	500	0	0			
Computations - - - - -	920	0	0			
				1,970	0	0
Total - - -				£10,000	0	0

Read—A letter (No. 1,904) from Mr. G. V. Vernon, F.R.A.S., requesting the Committee to publish certain tabulated readings for their continuous records.

Mr. Scott was instructed to prepare a reply.

Submitted—The Return of Telegraphic Intelligence issued and of Storms during 1870, ordered to be prepared for the House of Commons (Minutes, p. 43).

Mr. Scott stated that 94 telegrams had been sent out to the various coasts, and that 48 storms had occurred. Dividing the coasts into nine districts, and apportioning the telegrams to each, he had obtained the following tabular result, which he was ordered to append to the Return:—

——	Total number of warnings issued.	Warnings justified by subsequent gales.	Warnings justified by subsequent strong winds.	Warnings not justified.	Warnings late; force 9 reached at 2 stations.	Warnings partially late; force 9 reached at 1 station.	Warnings late, owing to Sundays or telegraphic errors.	Gales missed.
Ireland, South and West -	42	23	3	6	3	5	2	Jan. 1 Feb. 6$_s$ Oct. 15$_s$ Oct. 30$_p$ Nov. 11$_p$
—— East - - - -	47	18	16	11	—	—	2	Feb. 6$_s$ Oct. 15$_s$
Scotland, North and East -	31	10	3	14	1	2	1	Jan. 31$_s$ Feb. 6$_s$ May 9
—— West (Clyde) - -	42	13	9	14	—	3	3	Jan. 31$_s$ Feb. 6$_s$ Feb. 13$_s$ Oct. 15$_s$ Dec. 18$_s$
England, N.W., North of Holyhead	47	27	11	8	—	—	1	Feb. 6$_s$ Oct. 15$_s$
—— W. Holyhead—Barnstaple	43	27	9	2	—	2	3	Feb. 6$_s$ Feb. 27$_s$ Oct. 15 Oct. 22$_s$ Oct. 30$_s$
—— S. - - - -	40	20	11	7	—	—	2	Feb. 27$_s$ Oct. 15$_s$ Oct. 30$_s$
—— S.E., Dover to Yarmouth	30	11	7	12	—	—	—	—
—— E., Yarmouth to Berwick	27	14	7	4	1	1	—	—
Total - -	349	163	76	78	5	13	14	p indicates partially late; s late, owing to Sundays, &c.
Per-centages -		46·7°/₀	21·7°/₀	22·4°/₀	1·4°/₀	3/7°/₀	4°/₀	

In the above return force 8 is considered to justify a warning; but a warning is not *late* unless force 9 has been reached.

Read—A letter from Captain Toynbee, submitting an excellent log kept by Captain W. Symington, S.S. "Hong Kong," who has already received the Pilot Charts (Minutes, 1871, p. 13).

Mr. Scott was instructed to convey the best thanks of the Committee to Capt. Symington for his observations.

Read—A letter (No. 1,882) from the Superintendent of Pilots, &c. at Sydney, explaining the system of storm signals employed in New South Wales. The signals are a drum and double cone, by combinations of which the character of the gales is shown, while the district in which it is blowing is indicated by a system of flags.

Submitted—A notice from the Consul at Copenhagen, forwarded by the Board of Trade, announcing the establishment of a storm signal station at Skagen, in Denmark. The signals employed are the drum and cone.

The Committee then adjourned.

16, *Victoria Street, December* 18, 1871.

PRESENT:

Sir E. Sabine in the Chair.

Mr. De La Rue.	Mr. Gassiot.
Mr. Galton.	Admiral Richards.

Sir C. Wheatstone.

The Director was in attendance.

The Minutes of last meeting (Dec. 4) were read and confirmed.

Submitted—The following draft reply to Mr. Vernon's letter (Minutes, Dec. 4,) which was approved.

SIR, Meteorological Office, December 1871.

I HAVE laid your letter of the 1st instant before the Committee, and am instructed by them to inform you that before they could undertake so extensive a publication of the readings of their instrumental records as that which you suggest, it would be necessary for them to receive an assurance that what is proposed would be really acceptable to a number of meteorological investigators in some way commensurate with the cost of printing and paper.

The tabular results which are given to the public are drawn up on a scheme which has been devised so as to correspond as far as possible with the most approved foreign meteorological publications, such as those of Prussia and Austria, as regards the five-day means. The form of publication has not been adopted without the most careful deliberation. Daily mean values have not been given owing to the expense.

With reference to the last paragraph in your letter, "Making so elaborate a system of observations, and "yet not making them available for public use, is only waste of public money," I am to remind you that the question of the graphical mode of representation has been submitted to several of the most eminent meteorologists both at home and abroad, who have hailed it as a great advance on previous modes of publication. Among other points which have been rendered apparent by it, one of the most important is the unsatisfactoriness of single readings taken at any hour to represent the various phenomena.

You are doubtless aware that at the Congress in 1845, at Cambridge, a most important question, as to which no definite decision could be come to, was, at what special hours observations should be taken.

The only possible way of satisfying the requirements of every one who wishes to investigate would be to give all the hourly readings, a plan which was adopted in Russia but has now been given up.

As regards the contraction of our scale, I am to remind you that it has only been reduced to the extent of one fifth, as compared with that used in the Quarterly Weather Report for 1869. The advantages which have been ensured are the extension of the scale so as to render a change of datum rarer, and the placing of the wind records and the other curves on the same plate, so as to facilitate the comparison of one with the other.

G. V. Vernon, Esq., F.R.A.S., Manchester.

Mr. Scott stated he had received a letter from the Astronomer Royal, as President of the Royal Society, asking for some information respecting Kew, which he had supplied unofficially.

Read—A letter from Capt. Toynbee, submitting excellent logs kept by—

Capt. H. Henderson, barque "Hope" (Minutes, 1868, p. 60; 1869, p. 53; 1870, p. 36; 1871, p. 10).

Capt. J. Steele, S.S. "Erl King" (Minutes, 1871, p. 44).

Mr. Scott was instructed to convey to the gentlemen named the best thanks of the Committee.

Reported—That at the request of the Board of Trade a fishery barometer had been supplied to the harbour master's office at Dover.

Reported—That Mr. W. C. Truscott, who was appointed a temporary clerk on the 6th ult., had been found unfit for the work of the Office, and had accordingly left.

SUBMITTED the following STATEMENT respecting the RECORDS for NOVEMBER 1871, received from the SELF-RECORDING OBSERVATORIES, and which have been examined at KEW OBSERVATORY (*see* Minutes, 21st December 1868.)

Points noticed at Kew.	Aberdeen.		Armagh.		Falmouth.		Glasgow.		Kew.		Stonyhurst.		Valencia.	
ANEMOGRAPH :—														
Action	Good.		Good.		Good.		Fair.		Good.		Good.		Good.	
Records deficient	None.		None.		None.		12 hrs. V.; 11 D.*		None.		None.		None.	
Orientation verified	—		—		Nov. 13th.		23rd.		27th.		17th.		—	
Result of 40 *Remeasurements* :—	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.	Direction.	Velocity.
Greatest difference	1·0	1·0	1·0	1·0	1·0	1·0	1·0	1·0	0·0	1·0	1·0	1·0	1·0	1·0
Mean difference irrespective of sign	0·1	0·4	0·1	0·4	0·1	0·4	0·1	0·6	0·0	0·4	0·2	0·5	0·2	0·5
Residual difference (— Kew)	−0·1	+0·1	−0·1	−0·1	0·0	+0·1	−0·1	+0·1	0·0	−0·2	−0·1	+0·1	−0·2	−0·1
No. of errors discovered	0		0	0	0	1	0	8	0	0	3	1	1	12
BAROGRAPH :—														
Action	Good.		Good.		Good.		Good.		Good.		Good.		Good.	
Photography	Do.		Do.		Do.		Fair.		Do.		Do.		Do.	
Records deficient	None.		None.		None.		8 hours.†		4 hours.‡		None.		None.	
Result of 40 *Remeasurements* :—														
Greatest difference	0·0040		·0050		·0050		·0050		·0050		·0050		·0050	
Mean difference irrespective of sign	·0015		·0020		·0012		·0025		·0019		·0018		·0016	
Residual difference (— Kew)	—·0001		+·0007		—·0001		+·0019		—·0010		+·0007		+·0001	
Mean monthly difference between simultaneous barograph and barometer	·0020		·0023		·0021		·0026		·0022		·0011		·0023	
No. of errors discovered in entry of standard	0		0		0		0		0		0		0	
„ in calculating residual correction	0		0		1		0		0		0		3	
„ in applying residual correction	0		0		0		0		1		1		6	
„ in tabulation	0		0		0		1		0		0		0	
THERMOGRAPH :—														
Action	Good.		Good.		Good.		Fair.		Good.		Good.		Good.	
Photography	Do.		Do.		Do.		Do.		Fair.		Do.		Do.	
Records deficient	3 hours dry bulb. § 15 hrs. wet bulb.		1 hour dry bulb.		‖ 33 hrs. wet bulb. 7 hrs. do.		¶ 31h. dry & wet bb. 23 hrs. wet bulb. 9 do. do. through frost.		1 hour dry bulb. 23 hrs. wet.		35 hours wet through frost.		None.	
Result of 40 *Remeasurements* :—	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.	Dry.	Wet.
Greatest difference	0·30	0·30	0·20	0·20	0·20	0·20	0·30	0·30	0·20	0·20	0·20	0·20	0·30	0·30
Mean difference irrespective of sign	0·11	0·13	0·09	0·12	0·09	0·10	0·14	0·18	0·04	0·05	0·12	0·11	0·11	0·14
Residual difference (— Kew)	+0·06	+0·08	—0·05	—0·06	—0·01	—0·01	0·00	0·00	0·00	+0·01	+0·06	+0·07	0·00	—0·01
Mean monthly difference between simultaneous thermograph and thermometer	0·13	0·15	0·12	0·14	0·07	0·08	0·11	0·12	0·14	0·12	0·12	0·13	0·29	0·21
No. of errors discovered in entry of standard	0	0	0	0	0	0	0	0	0	0	0	0	0	0
„ discovered by subsidiary measurements	0	0	0	0	0	0	2	1	0	0	0	0	0	0
„ in maximum and minimum	0	0	0	0	0	0	0	0	0	0	0	0	5	1
„ in tabulation	0	0	1	0	1	0	0	0	0	0	0	0	0	2

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* Losses partly from stopping of clock and partly from the stopping of cylinder.

† Failure of gas.

‡ Do.

§ Doubtful through the action of frost.

‖ Out of action, and 7 hours are rendered doubtful.

¶ Through stoppage of clock, 23 hours out of action, and 9 through frost.

The following cheques for salaries for December were drawn :—

		£	s.	d.
For Office :				
R. H. Scott	Salaries and wages	66	13	4
J. S. Harding, jun.		15	16	8
J. S. Harding, sen.		*9	12	6
T. D. Bell		*5	0	0
C. W. Jacques, rent for quarter		133	13	0
For Observatories :				
T. Kerr, Valencia, salary		20	16	8
R. H. Curtis	Salaries and computations	9	3	4
F. C. Steventon		8	6	8
C. Stodart		*10	0	0
T. E. Allen		*7	10	0
E. Magrath		*7	10	0
J. P. Cutts		*4	7	6
For Telegraphy :				
F. Gaster	Salaries and computations	†14	11	2
F. Brodie		*†5	19	0
G. G. Francis		*†5	11	8
R. Sargent		*3	10	0
For Ocean Meteorology :				
H. Toynbee, Marine Superintendent		33	6	8
W. Salmon	Salaries and computations	20	0	0
R. Strachan		‡18	6	8
C. Harding		†12	10	8
J. A. Curtis		7	10	0
W. G. James		7	10	0
J. W. McVeagh		3	10	0
	Total	£430	15	6

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* Five weeks to the 30th.
† Including allowance for extra attendance.
‡ " " care of instruments.

The Committee then adjourned.

LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty,
For Her Majesty's Stationery Office.